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This list gives the abbreviated name of each serial cited in this volume of Botanical Abstracts. The abbreviations have been planned to be self-explanatory and no key has been deemed necessary. It will be noted that names of persons and places are always given without abbreviations. In some cases the place of publication of a serial is given in brackets at the end of the abbreviated name. It is planned that future lists of this sort will uniformly include the bracketed place-name excepting where it is a part of the name of the serial itself, in which case the place-name is without brackets.—Since it is frequently difficult for the reader to know what to regard as the initial word of the name of a serial publication, the alphabetical list has been enlarged to include practically all non-initial words, and these additional entries refer to the serial numbers shown for the complete entries. Thus, the abbreviation *Absts.* refers to 42, which is *Bot. Absts.*, etc.—Most of the complete entries are followed (1) by a black-face Arabic numeral and a colon or (2) by an Arabic numeral in ordinary type, a period and then another Arabic numeral (or a dash) and the letter *p*, for *pages*. The first case indicates that the volume-number (black-face) is given and that the first and last page numbers of the article are to follow the colon in a citation. When a Roman numeral or a letter, and a comma (both in black-face type) precede the black-face Arabic numeral, the Roman numeral or letter refers to the *series*. The black-face Arabic numeral always refers to the volume-number, whether within a series or not. In some cases the year takes the place of a volume-number, when the volumes bear no other designation. The second case indicates that the pagination is separate in each issue; the Arabic numeral (ordinary type) represents the number of the issue, which is followed, in a citation, by the total number of pages and the letter *p.*, in Italics.—It is hoped that future lists of this sort will be much more perfect than the present one. It is also hoped that a complete set of rules for making citations may eventually be published by Bot. Absts.—*Ed.-in-Chief.*

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BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1. **Dahl, J. L.,** Hints for collecting botanical and zoological material. School Sci. Math. **18:** 52–53. Ja., 1918.—Material should be obtained from neighborhood: dry fruits, seeds for testing viability, twigs, wood and bark, fleshy fruits, stages of development of apple fruit, and rare specimens in formalin.—GAGER.

2. **Gager, C. Stuart,** The near future of botany in America. Address of the vice-president and chairman of Section G, Amer. Assoc. Adv. Sci., Pittsburgh, December, 1917. Science N. S. **47:** 1–14. 1. F., 1918.—Discusses the national need for botanical research on pure as well as applied science, especially in genetics, physiology, ecology, and pathology; also additional facilities for technical and popular botanical publication and promotion of study of botany in high schools and colleges; exploration, sanitation, agriculture and horticulture, food, fiber and drug supplies, forestry and conservation.—GAGER.

3. **Lunell, J.** The collecting, drying and mounting of specimens. Amer. Midland Nat. **5:** 191–195. Ja., 1918.

4. **Monsch, Genevieve,** How school gardens tend to direct a natural course in botany. School Sci. Math. **18:** 36–42, 124–129. Ja.-F., 1918.—This course grew out of garden work. No textbook used; seed catalogs and garden guides were in constant use. Foundation of course was work out of doors. First lesson was on annuals, biennials and perennials. Work continued for ten weeks. Morphology of flowers, first in many textbooks, was taken up last. Constant intelligent questions proved success of method.—GAGER.

5. **Ragland, Fannie,** A study of shade trees for Grades Seven and Eight. Nat. Study Rev. **14:** 110–120. Mr., 1918.

6. **Vinal, W. G.,** Some mechanical aids in nature study. Nat. Study Rev. **14,** 60–73. F., 1918. Contains list of plants for various conditions; clear key to trees in winter.—GAGER.

7. **Waggoner, H. D.,** The fundamental relation of botany to scientific agriculture. School Sci. Math. **18:** 11–15. Ja., 1918.—A strong sentiment exists against the old type of botany. The science of alfalfa and corn is just as good as that of the orchid and alga. Botany should be more closely correlated with agriculture. The teacher of botany should have sympathy for and knowledge of present day agriculture.—GAGER.

ECOLOGY

H. C. Cowles, *Editor*

8. **Gravatt, C. F., and G. B. Posey.** Gipsy-moth larvae as agents in the dissemination of the white-pine blister-rust. Jour. Agric. Research **12**: 459–462. 1918.—The larvae of the gipsy moth hatch and are scattered by wind during the period of spore production of the white pine blister rust. The larvae feed abundantly on the spores, and their bodies in such cases are covered with numerous spores. Gipsy moth larvae feed freely on leaves of *Ribes*, and since it has been shown that these larvae may be blown as far as twenty miles, the authors conclude that they may be important carriers of infection.—H. C. Cowles.

9. **Harper, Roland M.,** The plant population of northern lower Michigan and its environment. Bull. Torr. Bot. Club **45**: 23–42. 3 fig. 1918.—From observations made in the vicinity of the Biological Station of the University of Michigan, at Douglas Lake, and from notes taken from car windows, has been compiled a somewhat quantitative estimate of the plant population of the northern part of the lower peninsula of Michigan. The geology, topography and climate as well as the vegetation are briefly described and a bibliography of much of the earlier literature relating to the plant life of this region is given.—Geo. D. Fuller.

10. **Roper, Ida M.,** Spartina and coast erosion. Kew Bull. Miscellaneous Information (No. 1) **1918**: 26–31. *1 map*. 1918.—Attention is called to the effectiveness of *Spartina Townsendi* in establishing itself in the soft mud of tidal flats, and to the extent that shore erosion is checked when such flats are thickly carpeted with this grass. Four years ago plantings of Spartina were made between the estuaries of the rivers Kenn and Yeo in North Somerset, England, where the severe tidal currents of the Severn have been very destructive. Already the plants have spread extensively and they bid fair to carpet the ground somewhat thoroughly.—H. C. Cowles.

11. **Waller, A. E.,** Crop centers of the United States. Jour. Amer. Soc. Agron. **10**: 49–83. *12 figs*. 1918.—"The crop centers of the United States agree with the biotic centers." For example, "the corn and winter wheat belts correspond to the deciduous central forest and the prairie climaxes, the tame hay and pasture region to the northeastern evergreen forest," and "the cotton belt to the southeasten evergreen forest. The rainfall-evaporation ratio map is useful for the demarcation of these centers, because in it are included four factors of climate, namely, relative humidity, temperature of the evaporating surface, and wind velocity as the divisor, and precipitation as the dividend.—"A fundamental difference between crop plants and the natural vegetation is seen when plants are found beyond their usual centers. The crops are found on the best soils only, since that is their sole chance to compete with other crops for profit. Plant invaders of the indigenous vegetation migrating from their centers can offer competition in the poorest habitats only. In the better habitats the plants belonging to the center are little influenced by invaders. In the extreme cases, climatic as well as soil modifications are practiced. Field plants are then grown on a comparatively large scale under glass or cloth shelter. The domesticated animals are grouped about the centers of production of those crops upon which they are most dependent. The methods used in studying plant succession have been used here. It is in this field of research that an accurate interpretation of conditions as consequences of the operation of physical forces of the past and present has been made. Migration, including invasion and competition, the latter implying dominance, are the direct results of interaction of climate and soils upon vegetation."—H. C. Cowles.

12. **Watson, Russell,** Relation of stimuli to the cone production of western hemlock. Jour. Forestry **16**: 168–175. 1918.—If the vegetative activities of thrifty western hemlock trees are suddenly checked by injuries, the tree usually is stimulated to reproductive activity. Factors which commonly stimulate the tree thus are injuries by fire and insects, mechanical abrasions, wind-throwing, decapitation, and girdling."—H. C. Cowles.

13. **Weir, Jas. R.,** Notes on the altitudinal range of forest fungi. Mycologia **10**: 4–14 1918.—Investigations of the occurrence of forest fungi in the higher mountains of Washington,

Oregon, Idaho and Montana leads to conclusion that, while a few species are strictly alpine in habitat, the majority of forest tree fungi have a wide altitudinal range being most abundant in the lower forested areas and decreasing very greatly as the upper limits of the timbered zones are reached. Temperature and variations in moisture conditions may greatly influence the form and color of the aerial parts of fungi occurring at higher altitudes, without changing their development within the substratum or affecting the vitality of the spores. Structural features of alpine woody plants, such as cutinization, thicker epidermis and denser wood, offer greater resistance to infection. A table is given of the highest known occurrence of each of over 80 species of forest tree fungi together with host and locality where the observaton was made.—Geo. D. Fuller.

GENETICS

Geo. H. Shull, *Editor*

14. **Bregger, T.,** Linkage in maize: The *C* aleurone factor and waxy endosperm. Amer. Nat, 52: 57–61, Ja., 1918.—Reference is made to investigations of Collins (Amer. Nat. 46: 569–590, 1912) demonstrating linkage between waxy endosperm and aleurone color of maize. Author's data, derived from F_1 plants heterozygous for waxy endosperm and a single aleurone color factor, back-crossed to double recessives, showed average percentage of crossing over of 26.7, A single back cross of an unrelated F_1 indicated independent inheritance, cross-over percentage 49.3. Colorless-seeded plants from pedigrees showing linkage gave colored seeds when crossed with colorless aleurone testers *a C R* and *A C r* and colorless seeds when crossed with tester *A c R*, thus indicating that *C c* is aleurone-factor pair concerned in linkage with waxy endosperm. Similar tests of plants of non-linkage cultures showed that neither *C c* nor *R r* was concerned.—R. A. Emerson.

15. **Cockerell, T. D. A.,** A new hybrid sunflower. Torreya18: 11–14, Ja., 1918.—F_1. generation of cross of *Helianthus annus* × *petiolaris* is described. Special interest in this cross lies in fact that certain other forms, namely, *H. aridus* and *H. petiolaris* var. *patens* have been suspected of being hybrids of above-named parents. Published descriptions, however, are so different from that of present hybrid that author is led to observe that "this hybrid is obviously not *aridus* or *patens*." Article includes brief historical discussion of several species of sunflower —L. H. Smith.

16. **Collins, G. N.,** Tropical varieties of maize. Jour. Heredity 9: 147–154. Ap., 1918.—Several types of maize possessing adaptive characteristics are noted and illustrated. Among these characters are single, long primary root, and mesocotyl capable of unusual elongation, of Hopi maize, adapting it to deep planting practiced by Indians of plains of Arizona and New Mexico; hairiness, surface rooting habit, and ability to grow at relatively low temperatures, of *Zea hirta*, adaptations to cool climate and light summer showers of high tablelands of Mexico; ability to withstand high temperatures, of another Mexican type; waxy endosperm and ability to withstand hot winds at flowering time, of a Chinese maize; the characteristic of remaining green long after maturity, of a Bolivian type; and the well protected ears of a maize from Guatemala. Suggests that, while none of these types is suited to wide commercial culture, they possess characteristics that might well be combined with valuable characteristics of common commercial varieties. As illustration of practicability of thus combining characters of diverse types, author cites cross of sweet corn, having poorly protected ears and therefore seriously injured by ear worms, with southern field corn, having ears well protected by long, thick husks, which resulted in production of sweet corn of good quality with well protected ears. Urges that survey of maize types be made and exchange of varieties between maize producing countries be effected.—R. A. Emerson.

17. **Collins, G. N.,** New-place effect in maize. Jour. Agr. Res. 12: 231–243. F., 1918.—Comparison of yields of locally grown and introduced pure-bred and hybrid seed of *Zea mais*. Controlled experiments, made with strains known to be identical, in Maryland, Kansas, Texas and Arizona, indicate that seed grown in another locality gives higher yields. Author con-

siders results due to physiological new-place effect. Since new-place effect in maize acts as stimulus it would tend to obscure any lack of adaptation in newly introduced varieties. Thus existence of new-place effect increases rather than decreases importance to be attached to local adaptation. While new-place effect must be considered as factor in production, this should not be used as argument in favor of general transfer of seed. No evidence that importance of using acclimatized seed has been over-estimated.—J. A. HARRIS.

18. **Cook, J. Glenn,** Unusual variation in crook-neck squash. Jour. Heredity 9: 24. Ja., 1918.—Figure illustrating diverse types of squash derived from "crook-neck" grown previous season in bed containing "scallop" and "crook-neck" squashes, with brief note of explanation. The forms varied from typical "crook-necks" to intermediate types between "scallops" and "crook-necks;" warts, typical of "crook-necks," were present on some specimens and absent on others; and color varied from white and light gray to yellow and orange.—RICHARD WELLINGTON.

19. **De Vries, Hugo,** Mutations of *Oenothera suaveolens* Desf. Genetics 3: 1–26, Ja., 1918.—*Oenothera suaveolens*, related to *Oe. grandiflora*, produced in pure culture, mutants: (a) *apetala*, "half race" having some flowers apetalous and considerable proportion with less than typical four petals; (b) *jaculatrix*, very narrow foliage; (c) *fastigiata* narrow leaves and erect branches; (d) *lata* with 15 chromosomes; (e) *sulfurea*, pale yellow flowers; (f) *lutescens*, pale foliage. *Fastigiata, jaculatrix* and *lata* are figured. *Fastigiata, jaculatrix, lutescens* and *sulfurea* bred true when selfed; *lata* selfed, or crossed with pollen of *suaveolens*, produced about 50 per cent *suaveolens*, 25 per cent each of *lata* and *lutescens*. Breeding capacity of *apetala* not yet tested. *Suaveolens* crosses with *sulfurea*, reciprocally, produced patroclinous F_1, and with *lutescens*, matroclinous F_1. Reciprocal crosses of *Oe. suaveolens* with *biennis* L., "*biennis Chicago*," and *syrticola*, and double reciprocals of *suaveolens* and *biennis* produced in each case uniform progeny, except that some *lutescens* appeared in *suaveolens* × *biennis*. *Suaveolens* with "*biennis Chicago*" gave hybrids intermediate but goneoclinic to latter species. In all other crosses reciprocal families distinctly unlike, mostly intermediate. Crossed with *Lamarckiana*, *suaveolens* produced intermediate hybrids plus about one-fourth *lutescens*. When *Lamarckiana* was pollen parent, green offspring were of twin types, *laeta* and *velutina*, but in reciprocal cross were uniform. No *lutescens* appeared in *Lamarckiana* mut. *lata* × *suaveolens*. Author attributes occurrence of large percentage of *lutescens* to mass mutations. —G. H. SHULL.

20. **De Vries, Hugo,** Mass mutation in *Zea mays*. Science, n.s. 47: 465–467. 10 My., 1918.—Author cites a case of mutation in maize, known as *Zea mays sterilis*, considered similar to mass mutation noted by Bartlett in *Oenothera Reynoldsii* and *Oe. pratincola*. Sterile plants devoid of branches, ears, ramifications of spike, and male flowers, appeared first in seventh generation of highly self-fertilized cultures, constituting 12 per cent of culture. Intermediate forms with incompletely developed ears and spikes also seen. One of latter yielded 19 per cent of sterile plants in eighth generation. Suggests sexual cells of fifth generation mutated to unbranched type and combined with normal gamete to produce intermediate, half mutant, in sixth generation, producing 12 per cent sterile mutants in seventh generation. Mass mutation considered important principle but known instances mostly retrogressive mutations. Reference made to apparent mass mutation in *Ranunculus arvensis, Linaria vulgaris, Papaver Rhœas, Scrophularianodosa, Clarkia pulchella*.—R. A. EMERSON.

21. **Dexter, John S.,** Inheritance in Orthoptera. Amer. Nat. 52: 61–64. Ja., 1918.—Brief review and criticism of work of Nabours on Parattetix. Nabours recognizes some fourteen color patterns as allelomorphic to each other andone "allelomorphic only to its absence." One of the fourteen while generally allelomorphic to the others is not always so. Author points out that Nabours's evidence indicates that the fourteen characters are determined by genes in one chromosome and that at least one of these is incompletely linked with the others. Character that is "allelomorphic to its absence" is simply first known character of another linkage group belonging to another chromosome. Cites similar situation in Drosophila few years ago, as illustration.—N. R. STOLL.

22. **Fernald M. L.,** American variations of Epilobium section Chamaenerion. Rhodora 20: 1–10. Ja., 1918.—Fernald recognizes following variants of *Epilobium* (*Chamaenerion*) *angustifolium:* (1) forma *albiflorum*, petals and sepals white; (2) forma *spectabile*, petals white, sepals red, (3) var. *macrophyllum*, leaves much broader than in type, secondary veins prominent, inflorescence leafy-bracted, lower bracts broad; (4) var. *intermedium*, plants low, leaves and inflorescence much shorter than in type; (5) var. *platyphyllum*, leaves bluntish or merely acutish. Data is given indicating definite geographical ranges for these variants. Second part of paper is largely discussion of Forsaith's and Jeffrey's claims that *Epilobium angustifolium* within range of its ally *E. latifolium* crosses with it producing hybrids distinguished from *angustifolium* by presence of much defective pollen. Fernald contrasts those characters of the two species which might be expected to be represented in hybrids, either modified or in recombinations, and which have not been described by Forsaith for the assumed hybrids. Forsaith's citations and map of distribution are sharply criticized as inaccurate and it is pointed out that supposed hybrids were frequently from stations from 100 to 1000 miles away from nearest colony of one of assumed parents.—Bradley M. Davis.

23. **Goldschmidt, Richard,** A preliminary report on some genetic experiments concerning evolution. Amer. Nat. 52:28–50. Ja., 1918.—Author concludes that multiple allelomorphs are different quantities of an active substance, perhaps enzyme. Conception is based in part upon experiments with gypsy moth, of which there are number of geographical races. Referring only to larval pattern, races differ in amount of pigmentation which encroaches upon light pattern common to all. In general, F_1 intermediate between races crossed, F_2 gives 3 light + medium to 1 dark, and back crosses a ratio of 1 to 1. Pigment factors in all races are allelomorphic to each other.

Races of gypsy moth also differ in pigmentation of successive instars of larva. Some are light in all stages, others develop varying degrees of deeper pigmentation in later stages. F_1 between constant light race and constant darker race is intermediate or lighter at first, but becomes dark later. These races likewise differ in rate of differentiation and number of moults, and degree of pigmentation is function of time of development. By prolonging larval stage through starvation, depth of pigment characteristic of fourth instar may sometimes be attained in third instar. When mosaic larvae, having two sides of body unequally pigmented, appear in shifting race, deepening of pigment in successive stages is about equally rapid on the two sides. Such larvae produce normal moths, and their offspring are normal.

These facts show multiple allelomorphs to be different quantities of active substance, producing effects in proportion to their quantity. Former work indicated that sex in this moth is in like manner dependent upon quantitative differences in sex factors, nearly balanced quantities resulting in intersexes.

Quantitative somatic factors owe their variations either to the medium, or to fluctuation of genes. If to latter selection of extremes is effective. Castle's selection experiments with hooded rats held to be in accord with results from gyspy moth. Geographical races, beginnings of species, owe origin to these quantitative differences in genes. Natural selection may aid in their establishment, even when visible character has no selection value. Thus, in *Lymantria monacha*, dark forms have replaced white ones, not because of pigment, but because they are stronger and better fliers. Replacement has occurred in recent decades probably because of industrial development, deforestation, and war on insect pests, against which weaker white forms could not maintain themselves. Races of gypsy moth are believed to be adapted to different climates, not because of pigment, but because of differences in relative duration of larval and pupal stages. Evolutionary conclusions unsafe, however, without genetic tests, for two somatic characters apparently precisely alike may be physiologically quite unlike. Thus, *Callimorpha dominula* exhibits in Germany yellow sport like yellow Italian race. Chemically these yellows may be identical, but moths behave very differently in crosses.

Quantitative theory of genes held to obviate difficulties attending explanation of temperature-aberrations in Lepidoptera, mimicry, and improvement of breeds under domestication.—A. F. Shull.

24. **Gortner, R. A.,** The anthocyanin pigments of plants. Science n. s. 47: 418–419. 26 Apr., 1918.—Review of book of same title by Muriel Wheldale. (Cambridge University Press, Cambridge, England, 1916.) Second part of book relates to "Anthocyan and genetics." Reviewer finds work thoroughly done, and author "extremely conservative" about formulating hypotheses, and making no attempt "to further any pet hypothesis."—G. H. Shull.

25. **Halsted, Byron D.,** Colors in vegetable fruits. Jour. Heredity 9: 18–23. Ja., 1918.—In tomatoes skin is either transparent or contains orange pigment, while flesh is either lemon yellow or pink-purple. Four possible combinations of two kinds of skin and two colors of flesh give rise to four colors of fruit: lemon, orange, pink and red. Color of skin and of flesh behave in simple Mendelian manner, orange skin being dominant to colorless, and pink-purple flesh to lemon-yellow. Some modifications of skin color are due to environmental factors, to thickness and smoothness of skin, and to hairiness.

In eggplants intensity of purple color varies in fruits of different varieties. Two classes of purple differ with respect to influence of sun, one developing without exposure to sun (as under the calyx), and other requiring exposure. In contrast to purple varieties, are white and green varieties having colorless skin. Difference between white and green varieties is due to color of flesh. Purple skin is dominant to colorless, and green flesh to white. Striped variety gave fruits slightly striped in F_1 from crosses with white varieties, and with purple-fruited varieties gave purple fruits in F_1. Variety "Long White" crossed with dwarf purple gave purple fruits in F_1 and purple, pink, green and white fruits in F_2.

In peppers skin is always colorless, while flesh is usually either red or orange. Orange is recessive to red. In variations of color which appear as fruit ripens, light green is recessive to dark green and changes to yellow, and various other colors are recessive to simple change from green to red.—C. F. Noll.

26. **Halsted, Byron D.,** Reciprocal breeding in tomatoes. Jour. Heredity 9: 169–173. Ap., 1918.—Discussion of characters of 120 plants of second generation from reciprocal crosses between varieties Dandy Dwarf (drawf plants with yellow foliage, coarse leaves, and red fruits) and Yellow Cherry (standard plants with green foliage, fine leaves, and yellow fruits). In number of instances, characters of respective crosses considered separately, differ widely from theoretical Mendelian ratio but totals from both crosses closely approach it. Besides four character pairs noted above, data are presented on relation of type of plant to weight, length and width of fruit; relation of color of foliage to weight, length and width of fruit; relation of type of foliage to weight, length and width of fruit; relation of color of fruit to weight, length and width of fruit. Author concludes that, for Mendelian characteristics, seed parent in both combinations shows more potent influence over offspring than does pollen parent. But with characters of fruit, weight and size, requiring averages for expression of results, evidence points to greater influence of pollen parent.—C. E. Myers.

27. **Hansen, Albert A.,** Petalization in the Japanese quince. Jour. Heredity 9: 15–17. Ja., 1918.—Illustrates intergradations of stamens and petals in *Cydonia japonica*.—J. A. Harris.

28. **Harris, J. Arthur,** The interrelationship of the number of stamens and pistils in the flower of Ficaria. Biol. Bull. 34: 7–17. Ja., 1918.—Statistical treatment of data published by Ludwig, Lee, McLeod, Weldon, and Pearson. Coefficient of variation for pistils is larger than for stamens. Tables of correlation between number of stamens and pistils, regression equations, and diagrams are given. Author concludes that, as total number of sporophylls increases, pistils are relatively more numerous than stamens. He deduces this by means of a formula, developed in an earlier paper, giving correlation between total number of sporophylls in a flower and deviation of number of pistils and stamens from their probable number. According to his results these correlations are of equal magnitude, but opposite in sign and negative for stamens.—Helene M. Boas.

29. **Harris, J. Arthur, and B. T. Avery,** Correlations of morphological variations in the seedlng of *Phaseolus vulgaris*. Bull. Torrey Bot. Club 45: 109–119. Mr., 1918.—Many thou-

sands of individual seedling bean plants were examined with reference to certain morphological abnormalities connected with development of first three nodes. These observations had to do with placement of cotyledons, number of cotyledons, number of primordial leaves, fasciation-like structure of internode above primordial leaves, division of axis in this same internode, number of leaves at third node, number of leaflets in third node leaves, and lobing in third node leaves. Frequencies of these abnormalities are tabulated in such manner as to show their correlations with one another. It appears that abnormalities connected with upper node and upper internode tend to increase according to amount of abnormality displayed at earlier stages of development of seedling.—L. H. SMITH.

30. **Harris, J. Arthur, and A. F. Blakeslee, in cooperation with Wm. F. Kirkpatrick,** The correlation between egg production during various periods of the year in the domestic fowl. Genetics 3: 27–72. Ja., 1918.— Analysis of data from annual egg-laying contests of White Leghorn fowl at the Connecticut Agricultural Experiment Station, 1913–14, and 1914–15. Correlations of monthly egg records with total number of eggs laid during the year, and with number laid during the remaining eleven months for purpose of determining selection value of records for each single month. Correlations of monthly with annual egg production range from 0.37 and 0.38 in November and April to 1.49 in February and 0.69 in September. Correlation of each month with the total for the remaining 11 months is less, but positive and statistically significant for every month, ranging from 0.24 to 0.57. Regression lines are nearly linear and in close agreement for the two years. Separation of flock on basis of egg-laying performance and elimination of poor layers in early months result in material increase in average annual egg production.

Correlations between individual months tend to become smaller as interval sbetween them becomes greater, but antagonistic to this principle is fact that correlation between autumn and winter months at beginning and at end of year tends to be greater than correlation of these months with intervening spring and summer months.

Influence of monthly egg production upon total annual egg production differs greatly in the several months, being greater in autumn and winter months than in spring and summer months.—G. H. SHULL.

31. **Hawkes, Mrs. Onera A. Merritt,** Studies in inheritance in the hybrid *Philosamia* (*Attacus*) *ricini* (Boisd.) ♂ *Philosamia cynthia* (Drury) ♀. Jour. Genetics 7: 135–154. F., 1918.—Larva of *P. cynthia* has seven complete longitudinal series of black spots, while five of these are entirely lacking in *P. ricini*, and remaining two are generally partially present, though variable. For sake of convenience, author calls former condition "spotted" (*S*), latter "plain" (*P*). All of 149 F_1 larvae resulting from this cross had spots on upper part of body; most had full complement of spots characteristic of *cynthia* and were therefore spotted (*S*), but some had only portion of these spots and were called "reduced spots" (*RS*). This state of affairs is referred to in summary as "incomplete dominance" in spite of fact that dominant homozygous and heterozygous forms could be distinguished only by breeding, both being either fully or partially spotted.

Twelve matings of moths of F_1 generation, produced F_2 families which consisted of *S*, *RS* and *P* types of larvae in proportions 3 (*R* + *RS*) to 1 *P*. Every variety of mating was made to test whether *S* and *RS* have different hereditary values, but gave no indication of any difference. In F_6, however, one family appeared, consisting entirely of *S* larvae. Author expresses belief that full spots are due to series of unit characters, linked to one another rather more closely than to other characters. No further support is given for this hypothesis. No families produced only *RS* forms. On other hand, 20 matings of plain to plain produced only plain larvae. *P* form is consequently regarded as simple recessive.

Another character dealt with was presence of abnormal tubercles on bodies of certain caterpillars in F_2. There were 47 abnormal individuals in about 900 F_2 larvae. Tubercles (normally long) were either entirely absent, very short or varying in length on various segments of body. Author was unable to mate two moths arising from these abnormal caterpillars, but normal was mated with abnormal. All offspring were normal, but in next generation (F_2 of this cross) "larvae occurred with long, with short, and with no tubercles,—an

obvious Mendelian segregation." Owing to unfavorable conditions, author was not able to determine adequately genetic behavior of this character.—F. B. SUMNER.

32. **Horsfeld, F. H.,** Longevity in lily pollen. Jour. Heredity 9: 90. F., 1918.—Pollen of early-blooming lilies, saved in envelopes, mostly effective after two or three months. Pollen of late-blooming *L. auratum*, wrapped in paraffin paper and kept in warm, dry place over winter, proved viable following spring on *Lilium martagon*, but later on other lilies gave no results. Author believes pollen potent only when first exposed to air and that if original lot from *L. auratum* had been preserved in separate envelope, and contents of each used as soon as opened, he would have been more successful.—J. P. KELLY.

33. **Hunt, Harrison R., and Sewall Wright,** Pigmentation in guinea-pig hair. Jour. Heredity 9: 178–181. Ap., 1918.—Attempt to correlate inheritance of coat color with form and distribution of diffuse and granular pigment in hair structure. Black and sepia hair contain black granules in cortex and medulla, usually more dense near tips. Red hair has yellowish granules in medulla, but few granules in cortex, which shows diffuse yellow. Yellow hair is dilute red, due to fewer granules and less diffuse pigment, but contains also some small black granules. Cream hair has very few granules, apparently black, but sections show no diffuse yellow pigment although authors suppose it probably present. Authors conclude that constitution of cortex imposes some obstacle to production of red pigment granules, but ensy for black overcomes this obstacle. Dilution factors likewise reduce black pigment but little, while red considerably. "Thus it seems plausible that there is some characteristic peculiarity of cortex of guinea-pig hair which diminished quantity of cortical granular pigment in much the same way as dilution factors reduce total granular pigment contents."—J. A. DETLEFSEN.

34. **Jeffrey, E. C.,** Evolution by hybridization. Jour. Heredity 9: 25–28. Ja., 1918.—Review of "Evolution by means of hybridization," by J. P. Lotsy (The Hague, Martinus Nijhoff, 1916). Lotsy explains hereditary variations as result of hybridization. Defines species as group of like individuals breeding true from seed, genetically pure when back-crossed. Shows species may be derived from self-fertilized or freely crossing heterozygotes which makes for apparent uniformity of progeny. Holds all groups in period of greatest luxuriance are heterozygous, and surviving forms are degenerate homozygous species. Equiseta are example. Reviewer believes facts of morphology and phylogeny show reverse of Lotsy's conclusion to be true for Equiseta and other cryptogams. Holds that many groups of Angiospems are plexus of hybrids rather than pure species. Therefore cannot depend upon experimental results alone, but must consider facts of morphology and phylogeny if we would arrive at truth.—WILBER BROTHERTON, JR.

35. **Kearney, T. H.,** A plant industry based upon mutation. Jour. Heredity 9: 51–61. F., 1918.—In 1899 U. S. Dept. Agric. introduced into this country principal varieties of Egyptian cotton, a superior long staple cotton which originated obscurely (doubtless by hybridization) in Egypt about 75 years ago. All varieties introduced were variable, field conditions in Egypt having favored unlimited cross-pollination, and were so unfruitful and late in ripening that selection was begun at Yuma, Arizona, in 1903, in "Mit Afifi," the variety then most extensively grown in Egypt. Gradual improvement resulted for several years. In 1908 sudden change occurred: two progeny rows differed strikingly from parents and from each other, giving rise to varieties "Yuma" and "Somerton," the first of which became basis of Egyptian cotton industry in Arizona; begun in 1912, 30,000 acres in 1917, and probably 100,000 acres in 1918. Variety "Pima," arising later from "Yuma," though commercially grown, has, by line breeding and coöperation of farmers in isolation of seed increase fields, been kept unif rm while "Yuma," because of free crossing, is variable. Indications of mutational origin of varieties developed in Arizona are: each derived from single plant which appeared suddenly, and in several characters differed conspicuously from parent stock; intermediate forms not observed; progenies remained uniform so long as cross-pollination with other forms was prevented. Origin by mutation seems fairly well established in numerous varieties arising in Egypt, though records are less complete. Though mutation in Egyptian cotton has been observed only in heterozygous stocks ("Pima," line-bred, has produced none) such extreme mutants as "Yuma" and "Pima" can scarcely be explained on recombination hypothesis; the

mutant characters are not found in any stock with which parents might have been crossed, and intermediates between parent type and mutant are absent or extremely rare.—FRIEDA COBB.

36. **Lippincott, William A.,** The case of the blue Andalusian. Amer. Nat. 52: 95–115. F.–Mr., 1918.—Author reviews data relative to blue Andalusian fowls. When mate *inter se* these produce blacks, blues and splashed individuals in ratio 1: 2: 1. Black and splashed mated together always produce blues. Bateson and Punnett's explanation, that blues are expression of heterozygous condition of single pair of allelomorphs, usually accepted. Goldschmidt has suggested interaction of two pairs of allelomorphic factors: (Q) (a quantitative pigment factor) and M (a mosaic factor), to account for monohybrid ratio, complete linkage assumed, so that nothing is gained over assumption of single pair of factors.

Author has studied distribution of pigment granules in feathers of the three kinds of birds. In blacks, pigment is in form of rods, which almost completely fill cell. Pigment particles are found in all parts of feather barbules including the hooklets. In blues predominating shape of pigment granules is round. Only very rarely elliptical or rod-shaped granules occur. Further, in typical blues pigment is not found in extremities of either curved or hooked barbules. Hooklets also entirely devoid of pigment. Pigmented feathers from splashed individuals show exactly same pigment arrangement and granule shape as in blues.

On this basis, author proposes another bifactorial hypothesis, factors being R which restricts size of pigment granule and determines its arrangement within cell, and E responsible for extension of pigment to all feathers of body. Genetic constitution of black is Er Er, blue-splashed, eR eR, blue Er eR.

To account for results so far described for these matings, necessary to assume complete linkage, but author points out that if crossing-over should occur occasionally and crossover gametes ER and er were produced in equal number matings with ordinary blues would still give 1: 2: 1 ratio. Individuals arising from these crossover gametes could be detected only by careful genetic analysis. In the rather meager data so far published such individuals might well escape attention. Author points out kinds of matings necessary to discover any of crossover types if they occur.

A small amount of data is given relative to crosses between blue Andalusians and White Wyandottes. F_1 offspring here all blue owing to presence of extension factor E. Promises further data from matings now in progress.—F. M. SURFACE.

37. **Love, H. H., and W. T. Craig,** Small grain investigations. Jour. Heredity 9: 67–76. F., 1918.—Largely exposition of plant breeding work in small grains at Cornell University Considerable increase in yield was obtained (shown by three-year average) by isolating pure lines from commercial varieties. Not possible to change type of oats in few years by selecting parent plants within pure line. Variation and correlation studies with oats and wheat were made, first, to determine amount and nature of variation and correlation and, second, to study effect of environment on their constants. Conclusions are: (1) conditions which result in reduced yield also result in reduced height, number of kernels, and number of culms, but in increased size of kernels; (2) low yield is produced by decrease in number of kernels rather than by decrease in their size; (3) variability decreases with decrease in means; and (4) correlations are more or less responsive to enviromental conditions. In crosses between "Sixty Day" oat and *Avena fatua*, yellow color of former exhibited production of well developed awns and pubescence on glumes. One type of *fatua*, when crossed with "White Tartar King," gave 15 pubescent to 1 non-pubescent plant in F_2 while another type gave 3 to 1 ratio in F_2. Two forms of black oats classed as same variety, gave white glumes in F_2 in ratio 15 black to 1 non-black. Naked oats crossed with hulled showed that nakedness behaved as simple monohybrid but the intermediates gave all gradations of naked condition. Fully awned was recessive to weak-awned and presence of ligule was represented by one and two factors in different sorts. Authors found evidence of linkage in oats. Red color of wheat kernels is represented in different sorts by one, two or more factors. Two successful wheat-rye crosses were made. Illustrations give idea of field technique as practiced at Cornell University, also appearance of several F_1 crosses and their parents.—R. J. GARBER.

38. **Metz, Charles W.**, The linkage of eight sex-linked characters in *Drosophila virilis*. Genetics 3: 107–134. Mr., 1918.—Describes following eight mutant characters and their linkage relations: yellow (body color), frayed (bands on abdomen), vesiculated (wings), magenta (eye color), hairy (eye surface), forked (bristles), glazed (eye surface), rugose (eye surface). Six of these are figured. Linkage relations indicate that these factors form linear series in order of succession above indicated, except that frayed may possibly be to left of yellow and glazed and rugose may be allelomorphic to each other. This series is in all essentials like sex-linked series of *D. ampelophila*. Single, double and triple crossing over occur. Crossover values vary slightly in the several experiments, but agree generally as to order of succession. No mutant factors are found in Y chromosome and no crossing over between X and Y. Yellow and forked resemble characters of same name in *D. ampelophila*, and linkage relations of these characters are approximately same in both species. There are 82 units between known extremes of sex-linked series in *D. virilis* as compared with 62.6 units in *D. ampelophila*, indicating either greater length of sex-chromosome in former species, or greater frequency of crossing over per unit of actual chromosome length. Author believes latter to be true.—G. H. Shull.

39. **Morgan, T. H.**, Inheritance of number of feathers of the fantail pigeon. Amer. Nat. 52: 5–27. Ja., 1918.—Fantail pigeons, having from 28 to 38 tail feathers, crossed to ordinary race, having 12 tail feathers. Forty-one F_1 birds ranged from 12 to 20, with modal number 14 F_2 (278 birds) ranged from 12 to 26, with mode at 14 to 15; much larger proportion of them were 12-feathered than in F_1. F_1 backcrossed to fantail gave 23 birds, ranging from 14 to 31. Three pairs of genes are enough to account for results. Data are presented indicating that one or more of genes for number of tail feathers is linked to gene for presence of oil gland, and to gene influencing color of tail feathers. Double feathers were observed, and study of them indicates that they probably arose from single rudiments that became split, rather than from separate ones that became fused. Castration of male pigeon produced no apparent effect on his plumage.—A. H. Sturtevant.

40. **[Popenoe, Paul]**, Meaning of genetic terms. Jour. Heredity 9: 91–94. F., 1918.—Glossary of some sixty terms used in modern genetical and eugenical literature.—J. L. Collins.

41. **[Popenoe, Paul]**, Budding incompatible cottons. Jour. Heredity 9: 181. Ap., 1918. —Many attempts to secure fertile crosses between American upland cotton, *Gossypium hirsutum*, and two Asiatic species, *G. herbaceum* and *G. indicum*, have all been unsuccessful. In many instances hybrid bolls appear to set and later drop as if due to some chemical incompatibility in development. To overcome this, Mr. Meade grafted the two varieties reciprocally, thus hoping that stock would exert such chemical influence on cion that development of hybrid boll would be carried to completeness. Cions flowered so late, however, that no flowers were open on stock plants. That cotton stock may chemically influence cion is shown by results of budding dark-green-leaved cotton on stock having dark red foliage and stems. Branch growing from bud cion developed some red color typical of stock. This change in color was more noticeable on first leaves of cion and less as branch grew older.—J. L. Collins.

42. **Robbins, Rainard B.**, Applications of mathematics to breeding problems. II. Genetics 3: 73–92. Ja., 1918.—Derives formulae for determining numerical relations of alternative types of offspring from monohybrid unit-character crosses after any number of generations under given methods of breeding. Part I gives formulae for sex-linked character, under random mating, assortative mating, brother and sister mating, and parent by offspring mating. Part II deals with independent (Mendelian) character when half of offspring are bred to one parent and half to other, and when offspring are bred to younger parent.—G. H. Shull.

43. **Root, F. M.**, Inheritance in the asexual reproduction of *Centropyxis aculeata*. Genetics 3: 174–207. Mr., 1918.—This lobose rhizopod; like Difflugia, is favorable for study of inheritance in clonal lines because no growth or other changes take place in spine-bearing shell

after its formation. Numerous distinct races occur. Author started with 50 individual lines, of which 20 died in first month and remaining 30 lines were apparently all diverse. Followed only 4 lines further. Parent-offspring correlations within populations showed high correlation with respect to spine number (0.806), shell size (0.903) and mouth size (0.732), and low with respect to shell form (0.107) and mouth form (0.142). Grandparental correlation values were a little smaller.

Results within single clone ("line 30") of 749 individuals are similar and indicate that diversities in size of shell, size of mouth and number of spines are decidedly inherited, while diversities in form of shell and of mouth are only slightly inherited. Correlation between shell size and spine number is practically zero. Selections for high and low spine number gave in most cases progressive effect, but in one case whole effect resulted from first selection, after which no progress was made. Author attributes inconsistency of results in different experiments to difference of correlation in different strains between external appearance and genotypic constitution. Disapproves tendency to call all inheritable variations, mutations, and would restrict that term to variations which are fairly large. For lesser heritable variations author suggests "genetic fluctuations" or "micro-mutations."—G. H. Shull.

44. Schmidt, Johs., Racial studies in fishes. I. Statistical investigations with *Zoarces viviparus* L. Jour. Genetics 7: 105–118. F., 1918.—Statistical and experimental investigations upon viviparous blenny have been conducted by author since 1914. Only statistical results presented in this paper. Over 25,000 specimens were examined with particular reference to (1) number of vertebrae; (2) number of rays in right pectoral fin; (3) number of hard rays in dorsal fin; (4) number of pigment spots in dorsal fin. First varied from 101 to 126; second, from 16 to 22; third, from 0 to 17; fourth, from 7 to 21. No difference was detected between sexes in respect to these characters and most characters exhibited high degree of constancy from year to year.

If A, B, C represent high values for number of vertebrae, hard rays and pigment spots, respectively, and a, b, c low values, six out of eight possible combinations ABC, ABc, etc. occurred in eighty populations analyzed. Dividing total geographic area considered, into four sections, each is in general characterized by particular combination of mean values. Despite many discrepancies in geographic distribution of mean values, rule seems to hold that average number of vertebrae, of hard rays and pigment spots, are essentially lower in fjoids than outside, even at points few miles apart.

While Zoarces is thus split up into numerous local races, all eel populations of Europe are identical. Author accounts for this on ground that former spends whole life in same very restricted area,—which is very far from true of eel.

Viviparous habit of Zoarces made possible individual offspring analyses. In respect to vertebrae, number in various offspring samples can exhibit considerable variation among themselves, and differ greatly from average for population. Individual offspring analyses showed that smallest unit hitherto considered, the local "race," may be resolved into still smaller elements, expressed by means of offspring samples. These smaller elements may differ widely from one another, but when added together reproduce picture of race itself. Average values characterizing "race" are primarily dependent upon quantitative proportion between genotypes,—only secondarily on environment.

No direct correlation was found between number of vertebrae and salinity of medium; thus does not support hypothesis that racial characters are determined exclusively by environment. On other hand very distinct gradation of average qualities found in fjord populations suggests that surroundings may be of importance, either directly or indirectly, but factors coming into play not yet determine. Paper is illustrated by one plate and abundant graphs in text.—F. B. Sumner.

45. Shamel, A. D., A dry blood-orange strain. Jour. Heredity 9: 174–177. Ap., 1918.—Study of bud variation in commercial orchard of "Ruby Blood" variety of common sweet orange, *Citrus sinensis*, a variety notable for its striking bud variations. Near top of a typical tree large limb was found having narrower and more lanceolate leaves and different habit from that characteristic of trees of this variety. Fruits borne on this limb appeared nor-

mal outwardly but when opened were straw-colored instead of deep blood, had thick rind and contained no juice whatever. Further search showed that this kind of bud sport was not uncommon and in some cases entire trees of this character were found. Occasionally typical blood oranges were found on the sporting branches. Oranges of this kind are not only worthless commercially but dangerous to reputation of growers of "Ruby Blood" oranges. Elimination is being practiced.—J. L. Collins.

46. Shamel, A. D., Striking orange bud variations. Jour. Heredity 9: 189–191. *2 pl.* Ap., 1918.—Tree of "Thompson strain," which originated by bud variation from Washington Navel orange has for eight years produced bud variations. Selection from fruit-bearing bud wood has resulted in isolation of three strains, "Washington," "Corrugated and "Thompson. Economically these three strains have very different values. Bud variation is considered frequent in Citrus varieties, and emphasis is laid on necessity of great care in selection of bud wood and of individual performance records.—J. A. Harris.

47. Shamel, A. D., Some variable ears of dent corn. Jour. Heredity 9: 29–32. Ja., 1918. —A number of unusual maize variations, including several "freak" forms of ears and one stalk abnormality are noted and illustrated. Suggests that such variations may be of importance to geneticists and urges that any unusual forms of maize be sent to investigators in U. S. Dept. Agric., universities or other institutions.—R. A. Emerson.

48. Shamel, A. D., Chrysanthemum varieties. Jour. Heredity 9: 81–84. F., 1918.—List of thirty-nine parent varieties of chrysanthemums with new variety derived from each through bud variation, together with published authority for each variation. Gives brief history of chrysanthemum culture from 1688, when already found in Dutch gardens, to 1899 when there were 8800 varieties in Europe, with probably some duplication in names. Flowers of somewhat different color at opening from that shown later may often account for some supposedly different varieties. Obviously only those relatively constant under changed cultural conditions can be regarded as true bud variations. Only bud variations affecting bloom usually attract attention, but variations in vegetative parts are common. Variegated varieties are examples of bud variation in vegetative parts. Bud variation may be so complete that flower falls in another class, as carmine anemone from reflexed carmine, incurved white from reflexed white, and striped from solid color. Some varieties have not been known to produce bud variations. Some propagate true for periods of years and then bud variations occur, while other varieties apparently produce variations any season. Instances of different-colored flowers borne on same plant, different-colored petals in same flower, and variations in leaf shape and arrangement, which occurred at Riverside, California, in 1917, are mentioned.—A. C. Arny.

49. Terao, H., Maternal inheritance in the soy bean. Amer. Nat. 52: 51–56. Ja., 1918. Crosses involving green and yellow cotyledon color showed maternal inheritance only. green cotyledon and seed-coat ♀ × ♂ yellow cotyledon and seed-coat showed maternal inheritance of seed-coat color; reciprocal cross gave Mendelian segregation, green dominant. Explanation based on assumption of two kinds of chlorophyll, one "Y" turning yellow at maturity, other "G" remaining green. Characteristics of chlorophyll due to heritable traits of chromatophores or cytoplasm. Seed-coat color due to pair of Mendelian factors, *H* prevents seed-coat becoming yellow when beans have yellow cotyledons "Y;" *h* permits change from green to yellow. *H h* have no effect in presence of green chlorophyll "G," seed-coats remaining green with both *H* and *h*.—Viggo Lund.

50. Tupper, W. W., and H. H. Bartlett, The relation of mutational characters to cell size. Genetics 3: 93–106. Ja., 1918.—Summarizes cases of mutation in relation to accompanying changes in cell size. Gives measurements of epidermal cells of calyx, petals and filaments, and diameter of body of pollen grains, and number of germination pits, in *Oenothera pratincola* and two of its mutations, *latifolia* and *gigas*. Concludes that half-dwarf habit of mut. *latifolia* is not due to smaller cells, but to fewer cells. Cells of mut. *gigas* are larger than in parent, but number of cells is fewer, resulting in less proportionate increase in size of organs than in size of cells. Increase of cell size results in decrease of metabolic activity. Not all

gigas mutations are alike, some being half-dwarf. Such half-dwarfs may be at same time cell giants. Change in cell size is not same in all organs or parts and it is not possible to determine which characters are directly and which only indirectly due to doubling of chromosomes.—G. H. SHULL.

51. **Valleau, W. D.,** Sterility in the strawberry. Jour. Agric. Res., **12**: 613–670. Mr., 1918.—Study of flowers of strawberry, which show correlation between flower position, floral part number, and size of fruit; also between flower position and fertility of pistils. Species, progenitors of cultivated strawberry, largely diecious with variability of staminate and pistillate parts. Sterility by pollen abortion, not incompatibility of normally-developed gametes, considered to be various expressions of tendency toward diecíousness and not result of hybridization. Sterility of later flowers of inflorescence more general in hermaphrodites than in pistillates suggests former have been derived from staminates of diecious wild forms. Parthenogenesis does not occur. Two cases of fleshy receptacle developed without stimulus of fertilized embryos. Aborted pollen in wild *Fragaria virginiana* and *F. americana* rare; common in cultivated varieties. Percentage of aborted grains not constant in individual flowers of a variety or in individual anthers of a single flower. Pollen degeneration occurring after tetrad stage, at the time of rapid increase in cell size, considered to be due to differential ability of new chromosome combinations giving selective elimination of gametes.—D. F. JONES.

52. **Whiting, P. W.,** Inheritance of coat-color in cats. Jour. Exp. Zoöl. **25**: 539–569. Ap., 1918.—Author presents new data bearing on all familiar color variations of cats. Results are in harmony with earlier work indicating that maltese and cream dilution is unit recessive to intensity, black recessive to tabby, and yellow a sex-linked variation from black or tabby, the heterozygous color being as a rule tortoise shell. He found cases, however, in which heterozygous females were nearly self black, and, on other hand, a case in which yellow female bred consistently as if heterozygous. Whiting finds that self white variation is simple dominant over color. He finds no simple mode of inheritance for blue eyes and deafness, often associated with self white, but suggests that white spotting factors may produce these effects when present in self white, White spotting proved highly irregular in inheritance. Author gives most interesting analysis of tabby pattern. Ticking of individual hairs with yellow is dominant over black, variations in width of ticking being due perhaps to multiple allelomorphs. Another feature of tabby pattern, however, stripping of coat as a whole, is not determined by this factor, but merely revealed more clearly by it. In the stripes, there is alternate strengthening and weakening of black as opposed to yellow, revealed clearly in presence of factor for ticking, and also alternate intensity and dilution of color, seen best in yellow cats. The stripes are interpreted as due to waves of general metabolic activity. Spots are due to interference of longitudinal and transverse waves. Three segregating types of striping were found, very narrow or lined (epistatic to others), medium or tiger, and very wide or blotched. Evidence favors hypothesis of three allelomorphs but does not eliminate possibility that two sets of factors may be involved. In conclusion there is an interesting discussion of the probable origin of colors of cats and relation of these to different types of coat patterns in wild Felidae.—SEWALL WRIGHT.

53. **Whiting, P. W.,** Sex-determination and biology of a parasitic wasp, *Hadrobracon brevicornis* (Wesmael). Biol. Bull. **34**: 250–256. Ap., 1918.—Virgin females produce only males, mated females usually produce both sexes. Author concludes that fertilized eggs produce females. Male has haploid number of chromosomes. First spermatocyte division is abortive. Habits of insect, and variation in color pattern and sex ratio are described.—A. F. SHULL.

54. **Wright, Sewall,** Color inheritance in mammals. VIII. Swine. Jour. Heredity **9**: 33–38. Ja., 1918.—Review of fragmentary observations and experiments, with attempt to put these disconnected data into logical scheme. White coat of Yorkshire and Chester red of Tamworth and Duroc Jersey, black with white points and occasional white splashes of Berkshire and Poland-China, belt of Hampshire and belted reds, wild coat of *Sus scrofa*, and

black of Hampshire and Essex, are tentatively explained by two independent allelomorphic pairs, *Dd* and *Vv* and set of triple allelomorphs, E_y, E_v, and E_h. Minor factors are assumed for intensity of red and restriction of black in red breeds, and minor factors for intensity of black and restriction of red in black breeds with white points. While suggestive, author points out more convincing data are necessary.—J. A. Detlefsen.

55. **Wright, Sewall,** Color inheritance in mammals. IX. The Dog. Jour. Heredity 9: 87–90. F., 1918.—Different colors and color patterns of the dog are discussed. Attempt is made to explain variations in colors and color patterns according to scheme given in Jour. Heredity 8: 373 (August, 1917). Black-eyed whites are probably comparable to black-eyed white mice and guinea-pigs. There are other whites due to dilution factor. Brown is recessive to black. Much more work is necessary before relations of many colors are solved.—E. Roberts.

56. **Wright, Sewall,** Color inheritance in mammals. X. The Cat. Jour. Heredity 9: 139–144. Mr., 1918.—Summarizes work which has been done on inheritance of color in cats. Solid white seems to be due to dominant factor. Dilution in maltese is due to simple recessive character, but inheritance of dilution in Siamese cat is not known. Tortoiseshell orange and pattern of common tabby cat are discussed. Scheme used in previous papers of this series on color inheritance in mammals, for explaining colors and color patterns, is employed in his paper.—E. Roberts.

HORTICULTURE

W. H. Chandler, *Editor*

57. **Brooks, Charles, and J. S. Cooley,** Effect of temperature aeration and humidity on Jonathan-spot and scald of apples in storage. Jour. Agric. Res. 11: 287–317. Pl. 32, 33. Nov. 12, 1917.—Covers experiments carried on in 1915–16, to determine factors influencing the development of Jonathan spot and apple scald. The two diseases are reported to be alike in the tissues affected, they have similar temperature responses and are similarly affected by aeration and humidity and by the maturity of the fruit. These similarities are great enough to suggest some close relationship in the fundamental causes of the two diseases. Both diseases were decreased by good aeration and by a fair degree of maturity and both were increased with a rise in temperature, the optimum being about 20° and the maximum about 30°C.

On Grimes and York Imperials apple scald developed in moist chambers at 0°, 5°, 10°, 15°, and 20°C. The rapidity of development increased with higher temperatures. In open containers no scald developed at any of the above temperatures except at 0°C. Apples stored in an atmosphere containing probably more than 5 per cent of carbon dioxide did not develop typical scald but developed a pungent alcoholic taste and finally broke down. The writers express the opinion that apple scald is largely due to abnormal conditions resulting from poor aeration. The occurrence of scald was accompanied by a decrease in total acids nd sugars.

The rate of skin color development in Grimes apples was increased by a rise in temperature and it was checked by poor aeration and apparently but little affected by relative humidity. Scald was found more serious on green fruit than on ripe fruit but developed more rapidly on the latter. Delay in storage of immature fruit delayed and lessened the development of apple scald. It is pointed out that the effect of delayed storage depends largely upon the initial maturity of the fruit and the degree of aeration during the delay. Aeration appears to play a very important part in prevention of apple scald. This fact seems to furnish an explanation for the small amount of this disease usually found in cellars and air-cooled storages.—Laurenz Green.

58. **Brooks, Charles, and Fisher, D. F..** Irrigation experiments on apple-spot diseases. Jour. Agric. Res. 12: 109–137. *Pl. 5.* Jan. 21, 1918.—Deals with the effects of soil-water

supply upon bitter-pit, Jonathan spot and certain other nonparasitic spot diseases of the apple. It also includes notes upon the effect of maturity upon the development of these apple spot diseases in storage. These apple spots are not due to fungi or bacteria. They have been frequently found on unsprayed fruit, thus making the theory that spray materials are responsible for the trouble seem untenable.

The work reported was carried on at Wenatchee, Washington, where very little precipitation occurs from April to October, making the trees entirely dependent upon irrigation for their soil-water supply during the growing season. The amount of spotting was determined at picking-time and notes were taken to determine the increase in spotting in storage. The amount of internal discoloration was determined at the close of the storage period. These experiments included observations on fruits from trees which had received heavy, medium and light irrigation, and medium irrigation until August and then heavy irrigation the rest of the season. Heavy irrigation followed by light irrigation, alternating irrigations between heavy, medium and heavy and between heavy, medium, heavy and medium. The experimental data also include observations on the influence of size and growth upon spotting.

The early stages of Jonathan spot are confined to the color-bearing cells of the skin of the apple. Heavy irrigation greatly increased the disease but not so much as medium followed by heavy irrigation. Light irrigation greatly reduced the trouble but heavy followed by light irrigation resulted in the lowest percentage of the disease. Sudden changes in the amount of soil-water apparently did not increase the disease. Large apples showed greater susceptibility to bitter-pit than did small ones, but with Jonathan apples heavy irrigation had more influence on the disease than did the size of the fruit. With Grimes apples heavy irrigation seemed to increase the trouble on small apples more than on the larger ones. Apparently large apples are affected because of certain conditions under which they become large rather than merely because they are large. Early picked, immature fruit seem to show a greater susceptibility to Jonathan spot than later picked, more mature fruit. Bitter-pit on Jonathan apples was worse on fruits that were picked early than on those that were picked late.—LAURENZ GREEN.

59. Ridley, V. W., Factors in transportation of strawberries from the Ozark region, U. S. Dept. Agric., Bureau of Markets, Market Documents No. 8, M. 25, 1918—Resuts obtained are applicable to all strawberry-producing sections. The investigation included comparisons of prompt cooling, delayed cooling, precooling in transit, the effectiveness of false floors as an aid in refrigeration, a study of temperatures in transit and the manner of loading for best refrigeration. Careful picking and handling and prompt and thorough cooling was found necessary to reduce losses from decay in transit. The use of salt in the ice bunkers immediately after loading and again at the first re-icing, about twelve hours later, were found effective in hastening the rate of cooling in the car. About 2.5 per cent of the ice capacity of the bunkers at the first application and 1 per cent at the second application of salt is advised when the fruit is at a higher temperature than 60. If at a lower temperature less salt may be used. Loading crates higher than four layers in the car was found to decrease the keeping quality of the fruit and higher loading is not recommended. A new system of bracing in the center of the car is described, using wedges instead of long braces. This was found efficient, and gave an equal loading capacity without piling the crates so high.—LAURENZ GREEN.

MORPHOLOGY

E. W. SINNOTT, *Editor*

60. Allard, H. A., Abnormalities in Nicotiana. Bot. Gaz. 65: 175–185. 1918.—Various types of synanthy are described for a species of Nicotiana (presumably *N. alata* Link and Otto). In *N. Tabacum* catacorolla was found to be a common abnormality in plants affected with the mosaic disease. In such cases this abnormality is not inherited and is apparently due to external conditions. Other species of Nicotiana rarely show it in connection with the mosaic disease. Instances of two growing points and of an abnormal number of corolla lobes are also recorded.—E. W. SINNOTT.

61. **Arber, Agnes,** Further notes on intrafascicular cambium in Monocotyledons. Ann. Bot. 32: 87–89. 1918.—A summary of the cases of intrafascicular cambium which have been reported shows that this feature occurs in all but two of Engler's cohorts of Monocotyledons. A list of fourteen families is furnished. It is stated that the feature shows best in young stems at a very short distance from the growing apex, also sometimes in young leaves.—M. A. Chrysler.

62. **Bower, F. O.,** Studies in the phylogeny of the Filicales. VII. The Pteroideae. Ann. Bot. 32: 1–68. 1918.—This paper is a continuation of the author's series on the phylogeny of the Filicales, and takes up the perplexing group of the Pterideae and their allies. Within the Pterideae of Prantl there are probably two distinct lines, the "Pterideae bi-indusiatae" (Pterid series), and the "Pterideae uni-indusiatae" (Cheilanthoid series). This paper is concerned chiefly with the former, and discusses the stelar structures and soral characters of Lindsaya, Paesia, Pteridium, Lonchitis, Histiopteris, Anopteris, Pteris, Acrostichum, and Saccoloma, drawing conclusions as to their phyletic positions. Either the outer or the inner indusium may be abortive in this series. Several members of the Dicksonioideae were also studied and steps in the abortion of the inner indusium were found. This fern series is believed to have sprung from some Schizaeoid source and to be related to the Pterid series as a collateral branch. It is noted that the point of origin of the sorus is apparently not always an absolutely constant character, since the ferns studied, though belonging to the Marginales, frequently show analogies with the Superficiales, due to a slide of the marginal sorus to a superficial position. The Superficiales, however, are believed to be ferns in which this slide took place so early in descent that the group is clearly distinct, phyletically.—E. W. Sinnott.

63. **Braun, E. Lucy.** Regeneration of *Bryophyllum calycinum*. Bot. Gaz. 65: 191–193. 1918.—The author records an instance in *Bryophyllum calycinum* where leaves attached to the plant produced shoots and roots plentifully from their notches. In many leaves almost all the notches produced shoots. Neither of these occurrences has been noted in the studies of Loeb on this species.—E. W. Sinnott.

64. **Cribbs, J. E.,** A columella in *Marchantia polymorpha*. Bot. Gaz. 65: 91–96. *Pls. I, II.* 1918.—A columella-like structure was observed in specimens of the sporophytes of *Marchantia polymorpha*. This "columella" consists of a dense cluster of elaters in the mid-region of the capsule, and extends from its base for about two-thirds of its length. The sporogenous cells accompanying the young elaters became completely disorganized. Author compares this columella to the elaterophore of Pellia. The disorganization of the sporogenous cells, however, suggests a pathological condition; but author thinks peculiarities noted are not due to external factors.—The development of the normal young sporophyte was studied, and excellent figures are given. The latter agree closely with those of Meyer in his recent work on the Marchantiales (1916, Russian). Meyer figures the cap of sterile cells noted by the author and this has also been noted in a number of other Marchantiales; e.g., Plagiochasma, Wiesnerella, Dumortiera.—D. H. Campbell.

65. **Douglas, Gertrude E.,** The development of some exogenous species of agarics. Amer. Jour. Bot. 5: 36–54. *7 pl.* 1918.—Since the gill development of agarics with a gill cavity has been quite thoroughly cleared up by Atkinson and others, the author has studied the following seven species which lack the universal veil; *Mycena subalcalina* Atkinson, *Hygrophorus mineatus* Fr., *H. nitidus* B. & C., *H. borealis* Pk., *Entoloma flavifolium* Pk., *E. grayanum* Pk., and *E. cuspidatum* Pk. Aside from certain minor variations in the differentiation and development of stipe, pileus and gills, the early development in these seven species is the same. The gills arise at the stem, on the exposed under surface of the rudimentary pileus and extend centrifugally until the margin of the cap is reached. "Except for the fact that these gills develop on the exposed under surface of the pileus and not within a gill cavity, their method of origin is the same as that of the endogenous forms of the Agaricus type recently studied."—F. A. McAllister.

66. **Fitzpatrick, H. M.,** Sexuality in *Rhizina undulata* Fries. Bot. Gaz. **65**: 201–226. 1918. —*Rhizina undulata* is said to be parasitic on conifers, the cause of a root disease. The material for this investigation was found in pine woods at Ithaca, N. Y., where the fungus was found to form a white, mold-like growth enveloping the roots. Young fruits appear first as little white knobs of mycelium. When they attain a size of about 1 mm. in diameter, the archicarps make their first appearance, 3–8 in each ascocarp. Very shortly after, black spines grow out from deep-seated sterile tissue. All the cells of the ascocarp were found to be multinucleate from the first. The archicarps are loosely coiled or undulating threads, transformed from ordinary multicellular hyphae in the center of the ascocarp. They consist of from ten to nineteen cells each, multinucleate throughout, the nuclei increasing greatly in number by repeated divisions. Terminal cell of each archicarp is attenuated and at maturity its contents are disorganized. The author suggests that if it be a trichogyne it is no longer functional. There are no antheridia. When the archicarps are mature contiguous cells become continuous by the organization of a central pore in each septum. The nuclei migrate to the middle cells of the archicarp. From these middle cells (about half the total number) the ascogenous hyphae grow out. The nuclei in these hyphae are paired, but no conjugate divisions were observed. No nuclear fusions were seen in the archicarp and the author is of the opinion that a double nuclear fusion in the life history of none of the Ascomycetes has so far been demonstrated. The asci in Rhizina originate from croziers and into each young ascus there enters a pair of nuclei which very soon fuse. The cytology of the ascus was not investigated. In reviewing the conflicting views regarding the phenomena of sexuality in the Ascomycetes, the author points out that "the questions involved in the study of the nuclear history of the Ascomycetes will never be satisfactorily answered by *a priori* argument," a weakness which he considers characterizes a good deal of the work of the past.—J. H. Faull.

67. **Hodgson, Robert W.,** An account of the mode of foliar abscission in Citrus. Univ. California Publ. Bot. **6**: 417–428. *3 figs.* 1918.—This paper, on the shedding of the young leaves of the "Washington Navel" orange, *Citrus sinensis*, and of the "Eureka" lemon, *Citrus Limonum*, covers a histological and cytological study of the abscission zone and separating layer prior to and during the process of abscission as distinguished from exfoliation. Citrus was studied because of its economic importance and because few data are available on abscission in thick walled tissues. The plants were greenhouse grown. The behaviour of the two species was similar. Abscission was induced by placing cuttings in a moist chamber, at room temperature, for 24–96 hours. The temperature and age of the material were important factors. The introduction of illuminating gas and CO_2 of varying concentrations did not materially alter the results.

The abscission zone, of 10–18 cell layers with the separation layer at the upper end, arises at or near the base of an internode, abscission occurring at the base of the terminal leaflet roughly opposite the grooved ring and also at the base of the petiole 8–10 cells distal to the grooved ring. Ring years no definite relation to location of abscission zone. Zone is preformed and ready to function upon proper stimulation. In young material there are no visible histological differences delimiting the zone. In older material the zone cells are smaller, isodiametric, and have denser contents than those adjoining. Abscission involves the separation of the cells along the middle lamella, but no cell divisions or elongations of the tertiary membranes were observed. All tissues across the petiole except the tracheae and the cuticle function in separation. Before abscission much starch is present in the zone cells, but this is largely withdrawn or used. After separation the cells continue growth and division and use any residue present. The first stage of the cell separation consists in a marked swelling and gelatinization, not only of the middle lamellae but of the entire walls with the exception of the tertiary membranes. Secondly, a dissolution of the gelatinized walls by hydrolysis occurs. There is little evidence that turgor plays any considerable rôle as a causal agent in the separation.—Eloise Gerry.

68. **Loeb, Jacques,** Chemical basis of correlation. I. Production of equal masses of shoots by equal masses of sister leaves in *Bryophyllum calycinum*. Bot. Gaz. **65**: 150–174. 1918.—This paper is a continuation of the author's studies of correlation in Bryophyllum.

Equal masses of sister leaves (fresh weight) were found to produce approximately equal masses of shoots in equal time and under equal conditions. This was shown by a series of experiments comparing the weight of shoots per unit of weight of detached sister leaves from which they grew (1) when both leaves were intact, (2) when both were divided into halves, (3) when one was intact and the other cut into four or more pieces, and (4) when one was intact and the other had its center removed. The number of shoots which were allowed to develop and the size of the pieces into which a leaf was cut were found to modify but slightly the weight of shoot produced by a given leaf. From an isolated leaf suspended in moist air a large number of shoots begin to grow. The one or two which start first persist and become large, thus inhibiting the growth of the others, presumably by attacting the bulk of the food material. Evidence is presented that the amount of available water determines where the first shoots shall be produced. These two factors (the limited amount of material available for growth and the automatic attraction of the material by the buds which grow out first) are held to explain the inhibiting effect of these buds on the growth of the others. No explanation of the mechanism for this attraction is suggested.—E. W. SINNOTT.

69. **McNair, James B.,** Secretory canals of *Rhus diversiloba*. Bot. Gaz. 65: 268–273. 1918.—The intercellular resin passages of *Rhus diversiloba*, the "poison oak" of the Pacific slope, were found in the roots, stem, leaves and fruit in the phloem of the primary bundles and also in the secondary bast of the stem and root, in the phloem of the mesocarp of the fruit and in the hypocotyl and cotyledons of the embryo. Resin passages were not found in the anthers, pollen, xylem, epidermis, cork cells and trichomes, hence these parts are non-toxic. The canals originate schizogenously but a few cases were noted which indicated the possibility of lysigenous development. Tangential anastomoses of the resin ducts were noted, especially in the nodes. No essential difference in the anatomy which would explain the poisonous or non-poisonous character of the species of the Anacardiaceae was found. The fresh resinous sap emulsion of *R. diversiloba* is the only part of the plant capable of producing dermatitis. This is non-volatile but may be transported mechanically by the wind. (Other work on this point by the author is cited.) The liability of poisoning is greatest in spring, less in summer and fall and least when the plant is leafless.—ELOISE GERRY.

70. **Sax, Hally Jolivette,** Spore-formation in *Philocopra coeruleotecta*. Amer. Jour. Bot. 5: 61–78. *Pl. 9–11.* 1918.—Spore-formation in the 128-spored ascus of *Philocopra coeruleoecta* is essentially the same as in an 8-spored ascus. Beginning with the fusion nucleus in the ascus, seven successive mitotic nuclear divisions follow, and except for a decrease in size of the spindles no differences among them were noted. The author confirms Overton and others in finding that in multi-spored asci the spores originate by free-cell formation and that at first the nuclei of the young spores are beaked and adherent to the plasma membrane. The conclusion that there is little in common between a multi-spored ascus and a phycomycetous sporangium is quite in harmony with the established status of the 8-spored ascus.—J. H. FAULL.

71. **Stokey, Alma G.,** Apogamy in the Cyathaceae. Bot. Gaz. 65: 97–102. 1918.—Cases of apogamy previously reported are from families other than Cyathaceae, mostly from Polypodiaceae. A prothallium of *Dicksonia squamosa* showed no archegonia but two apogamous buds and numerous antheridia. Specimens of Cyathea presented unusual growths from the central cell of an archegonium. No conclusions could be drawn from cultural conditions as to the factors favoring apogamy.—M. A. CHRYSLER.

72. **Tenopyr, Lilian A.,** On the constancy of cell shape in leaves of varying shape. Bull. Torr. Bot. Club 45: 51–76. 1918.—In a study of the leaf cells of Linum, Lobelia, Campanula, and other forms the following conclusions are reached: The average *cell size* in a given tissue of a given variety or species is a fairly constant hereditary character, as certain other workers also have stated. Cell size depends in part upon the stage of development of the plant at the time the organ is formed; the size diminishes somewhat in a series of successively formed organs. Differences in the size of organs are due to differences in the number, not the size, of the cells. Hereditary size is therefore here dependent upon the rate and duration of cell

division.—The cells of the leaf have a characteristic length and breadth in a given species. Differences in leaf shape in the same plant or in a related species are not due to differences in *cell shape*, but to different numbers of cells along various axes. Leaf shape is therefore due to factors periodically limiting cell division in certain directions.—L. W. SHARP.

73. **Thompson, W. P.,** Independent evolution of vessels in Gnetales and Angiosperms. Bot. Gaz. 65: 83–90. 1918.—The type of vessel believed to be highest in evolutionary scale is the so-called "porous" vessel, characterized by perforation of the end wall by a single large pore. This is found characteristically in the most advanced forms both of the Gnetales (Gnetum), and of the Angiosperms. Thompson shows that this structure has arisen in the two groups in different ways. In Gnetum the perforation has been formed by the enlargement and fusion of several irregularly placed bordered pits, and by the loss of the membranes. This is demonstrated by the nature of the vessels of the conservative regions, these being similar to those of Ephedra (the most primitive of the Gnetales), where perforation consists of the loss of membranes from otherwise nearly normal bordered pits; or of transitional nature between the two types, showing often half-formed large openings made up in part of membraneless rounded pits. Among Angiosperms the lower type of vessel is generally admitted to be that with scalariform perforations. This has arisen from the tracheid of lower forms in one of two ways: by the perforation of scalariform bordered pits of an ancient type of tracheid, or by fusion and perforation of the common circular multiseriate pits. The porous vessel has clearly been developed from the scalariform. Thus in both cases several bordered pits have become a single large perforation, but in Angiosperms a stage with narrow horizontal slits intervenes. There can be no genetical relationship between the vessels of these two groups.—Thus the vessel which has long and prominently been used as the connecting link between the highest Gymposperms and the Angiosperms can no longer be evidence for relationship between these groups, even for their origin from a common vessel-possessing ancestor. Rather, we have a good example of the attainment by two groups of plants of the same level of evolutionary development of xylem.—A. J. EAMES.

74. **Weston, W. H.** The development of Thraustotheca, a peculiar water mould. Ann. Bot. 32: 155–173. *Pl. IV, V, 2 figs.* 1918.—The author gives a more complete and detailed description of this rare and somewhat anomalous genus of Saprolegnaceae than has heretofore appeared, considerably extending and supplementing the observations of previous writers as to its morphology, development and reproduction. The account is based, for the most part, on the direct examination of living material which was grown in pure cultures, both gross and microscopic. The formation and peculiar dehiscence of the sporangia, the several types of germination of the sporangiospores, the detailed structure and development of the zoöspores, the occurrence and significance of gemmae, the development and interrelation of the sex organs, the correlation between the presence of antheridia and the formation of eggs, and the relation of the reproductive activities to the supply of nutriment, are among the more important matters considered. The author concludes that the genus is related to Achlya rather than to Dictyuchus. The paper is fully illustrated.—R. THAXTER.

75. **Whitaker, Edith S.,** Anatomy of certain goldenrods. Bot. Gaz. 65: 250–260. 1918. —A further contribution to our knowledge of the anatomical mechanism by which the herbaceous type of stele has been derived from the woody. Miss Whitaker demonstrates the origin of the herbaceous stem in the Compositae (Solidago). The woody tissue surrounding the leaf traces near their points of departure from the stele is transformed into "storage parenchyma." Radial bands of non-woody cells thus penetrate the vascular cylinder. These are subtended by the trace itself, beginning weakly some distance below the point of exit of the trace, becoming strongly developed, and ending abruptly just above the point where the trace passes out through the band. In cross sections these bands seem to split the stele into alternate broad "rays" and fibrovascular bundles. In the more slender upper parts of the stem, the vascular ring is thinner, and the storage parenchyma is necessarily limited to the sides of the trace. Thus a stele of more nearly equal separate bundles is formed. This demonstrates for a family at the top of the dicotyledonous series the working out of the same general principles, as have already been shown for lower forms—Betulaceae, Fagaceae, and Rosaceae.

The leaf trace bundles, when in the cortex, are shown to be bicollateral. The presence of internal phloem in this very conservative region suggests the idea that the Compositae formerly possessed internal phloem in the stem, as do the Cucurbitaceae and other high dicotyledonous families.—A. J. EAMES.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

76. **Knowlton, F. H.,** Fossil floras of the Vermejo and Raton formations of Colorado and New Mexico. U. S. Geol. Surv. Prof. Paper 101. P. 223–437. Pls. 30–103. 1918.—Economically important coal-bearing formations of palustrine origin in the Raton Mesa country of northeastern New Mexico and southeastern Colorado have long been worked. Geologists have disagreed regarding the age of these deposits. Following an extended account of the geology of the region by W. T. Lee, the fossil plants, which occur in abundance in association with the coal seams, are described by Knowlton. Two general horizons are recognized—the Vermejo formation, which is of late Upper Cretaceous age, and the Raton formation, of lower Eocene age.

The Vermejo flora comprises 108 species and includes a few doubtful fucoidal forms, an abundance of conifers, including Sequoia and Widdringtonites, a few ferns and monocotyledons, and numerous dicotyledons. Ficus and Viburnum appear to be the most diversified genera. New species are described in Asplenium?, Osmunda, Sequoia, Cupressinoxylon, Sabal, Canna?, Juglans, Myrica, Salix, Populus?, Quercus, Ficus, Artocarpus, Credneria, Laurus, Amelanchier, Phaseolites, Colutea, Celastrus, Zizyphus, Sterculia, Pterospermites, Hedera, Vitis?, Cissites, Diospyros?, Viburnum, Palaeoaster, and Phyllites. This flora is regarded as indicative of a warm, moist climate lacking marked seasonal changes.

The Raton flora comprises 148 species and includes a few Polypodiaceae, many large palms and numerous dicotyledons, particularly among the Amentiferae. New species are described in Dryopteris?, Pteris, Asplenium?, Anemia, Alismaphyllites, Sabal, Geonoma, Juglans, Populus, Fagus, Quercus, Ficus, Artocarpus, Aristolochia?, Castalia, Magnolia, Laurus, Oreodaphne, Cinnamomum, Liquidambar?, Platanus, Cercocarpus, Prunus, Sophora, Cassia, Inga, Euphorbocarpum, Rhus?, Celastrus, Acer, Sapindus, Rhamnus?, Apeibopsis?, Tilia, Sterculia, Dombeyopsis, Vitis, Cissus, Aralia, Cornus, Andromeda, Chionanthus, Apocynophyllum, Viburnum and Phyllites. The Raton flora is regarded as indicative of a moist, warm temperate climate and a prevailingly swamp environment. The report is profusely illustrated.—BERRY.

PATHOLOGY

DONALD REDDICK, *Editor*

77. **Allard, H. A.,** The mosaic disease of Phytolacca decandra. Phytopath. **8**: 51–54. *Fig. 1–2.* 1918.—The disease resembles mosaic of tobacco in general symptoms, in communicability, incubation period, etc., but the two are not intercommunicable. The infective principle survives the winter in the underground portions and appears in the new shoots. There is every reason to believe that carriers of infection at times become active but the aphides that spread the tobacco mosaic are not agents for communicating this disease.—D. REDDICK.

78. **Appleman, C. O.,** Investigations in progress. Plant Physiology. Maryland Agric. Exp. Sta. Ann. Rept. **30**: viii–ix. Ja., 1918.—Studies of the abnormal carbohydrate metabolism in potatoes affected with the spindling-sprout disease are mentioned.—J. B. S. NORTON.

79. **Bakke, Arthur L.,** Longevity of Helminthosorium teres. (Abstract.) Phytopath. **8**: 80. 1918.—Organism in pure culture in a test tube remained alive from January, 1911, until November, 1917.—D. REDDICK.

80. **Ballard, W. R.**, Investigations in progress. Pomological and small fruit investigations. Maryland Agric. Exp. Sta. Ann. Rept. **30**: x–xi. Ja., 1918.—Some vinifera type grapes grew well, others died. Mildew was very injurious to some grape varieties. Seedlings of "Clinton" crossed with tender vinifera varieties were hardy and mildew resistant. Quinces blighted severely. Blackberry varieties differ in injury from rust, double blossom and winter injury. Nutt and Ricard type of geraniums seem more disease resistant.—J. B. S. NORTON.

81. **[Besley, F. W.]**, Report of the Maryland State Board of Forestry for 1916–17, p. 17–24, 45, 71–86. 1918.—A tabulation of the forest fires of the State for the two years shows that 305 fires burned over 60,547 acres of timber, valued at about $110,999. Extensive investigation of the white pine plantings and nurseries for two seasons failed to reveal the blister rust in Maryland.—J. B. S. NORTON.

82. **Brooks, Charles, and J. S. Cooley**, Air movement as a factor in the prevention of apple scald. (Abstract.) Phytopath. **8**: 69. 1918.—Apples stored at 15°C. in practically saturated atmospheres containing 1.5 to 5 per cent CO_2 scald badly where there is no air movement but have remained free when the air is kept in constant motion.—D. REDDICK.

83. **Brooks, Charles, and D. F. Fisher.** Soft scald of apples and cherries. (Abstract.) Phytopath. **8**: 68–69. 1918.—Scald increases with an increase of CO_2 content of container or a rise in temperature. Red color of the skin fades and softening and browning of flesh follows. Mechanical injuries are centers. A film of moisture favors development of scald.—D. REDDICK.

84. **Burkholder, W. H., I. M. Hawley, and E. W. Lindstrom.** Some results of the New York State bean investigation. Proc. New York State Fruit Growers' Assoc. (17th Ann. Meet.) **16**: 120–125. 1918.—Under the sub-title, Diseases of beans and the improvement of the crop through breeding, is discussed in a semi-popular way: dry root rot, caused by *Fusarium* sp.; Rhizoctonia root rot; black root rot, caused by *Thielavia basicola*; anthracnose and mosaic. An anthracnose-resistant white marrow bean is reported. Mosaic is most common in the field on pea and medium beans.—D. REDDICK.

Butler, O., On the preservation of phytopathological specimens iu their natural colors. Phytopath. **8**: 66–68. 1918.—A specimen jar of appropriate size is filled with a 1 per cent. solution of sodium bisulphite; citric acid (or other acid, preferably organic) is then added until a strong odor of sulphur dioxid is given off, then the specimen to be preserved is placed in the solution and the jar sealed. At the end of 0.5–2 hrs. (sometimes longer) the jar is opened, the bleaching solution immediately poured off, replaced once with water and then with a 4 per cent solution of formaldehyde. The specimen is to remain permanently in this solution. The bleaching solution should be allowed to act only until the color most difficult to retain begins to fade.—D. REDDICK.

86. **Carpenter, C. W.**, Report of the Plant Pathologist. Rept. Hawaii Agric. Exp. Sta. **1917**: 33–42. *p. I V and V.* Ap., 1918.—The following diseases of the Irish potato have been identified in Hawaii: Late blight (*Phytophthora infestans*), wilt (*Fusarium oxysporum*), rosette and scurf (*Rhizoctonia solani*), tuber rot (*Fusarium oxysporum* and *F. radicocola*), and a new foliage disease apparently induced by a species of mite. Bordeaux mixture is demonstrated effective in controlling *Phytophthora infestans*.—The occurrence of a disease of bananas similar to the Panama wilt is noted and other banana maladies are mentioned. Other diseases identified are as follows: Bean, anthracnose, (*Colletotrichum lindemuthianum*); celery, late blight, (*Septoria petroselini* var *apii*); sweet potato, scurf (*Monilochaetes infus, cans*), soft rot, (*Rhizopus* sp– and *Fusarium solani*), leaf spot (*Septoria bataticola*); tomato leaf spot, (*Septoria lycopersica*), blight, (*Phytophthora infestans*).—C. W. CARPENTER.

87. **Chandler, W. H.**, Influence of low temperature on fruit growing in New York State. Proc. New York State Fruit Growers' Assoc. (17th Ann. Meet.) **16**: 186–194. 1918.

88. **Chapman, G. H.**, Mosaic disease of tobacco. Massachusetts Agric. Exp. Sta. Bull. **175**: 69–117. *Pl. I–I V.* My., 1917.—A brief review of the work of previous investigators and the results obtained by the author relating to the cause, reactions of the causal agent, and

experimentally its close parallelism to enzymatic processes. The author holds that the disease is not caused by an organism, at least in the ordinary concept of that term. It is also shown that the primary infection occurs in a majority of cases in the seed-bed. Results obtained by the excessive use of fertilizer constituents and lime apparently do not indicate any relationship to the intensity of the disease. The effect of colored light on the disease is also discussed, and, contrary to Lodewijks' results, no control was indicated, although the visible symptoms of the disease were in some cases suppressed. Specific methods for control are recommended.—P. J. ANDERSON.

89. **Coons, G. H., and F. A. Spragg,** Resistance and susceptibility of certain wheat varieties to loose smut. (Abstract.) Phytopath. 8: 60–70. 1918.—Variety "Going's" much more susceptible to *Ustilago tritici* than "Shepherd's Perfection." D. REDDICK.

90. **Corry, E. N., and P. Garman,** Investigations in progress. Maryland Agric. Exp. Sta. Ann. Rept. 30: xiii. Ja., 1918.—Treats briefly of the relation of a mite *Tarsonemus pallidus* to leaf spots of geranium and other plants.—J. B. S. NORTON.

91. **Doolittle, S. P., and W. W. Gilbert,** Further notes on cucumber mosaic disease. (Abstract.) Phytopath. 8: 77–78. 1918.—The infective principle apparently does not overwinter in soil or seed. Striped beetles carry it, as do pickers. The disease has been communicated to 18 species in 10 genera of Cucurbitaceæ. Attempts to control the disease have not met with success.—D. REDDICK.

92. **Durrell, L. W.,** Factors influencing the uredospore germination of Puccinia coronata. (Abstract.) Phytopath. 8: 81–82. 1918.—Spores must lie in a film of water. They do not germinate in a moist atmosphere nor submerged in water, nor do they germinate in the absence of oxygen. Cardinal temperatures are: min. 0 to 2°C., opt. 18 to 22°C., max. 35°C.—D. REDDICK.

93. **Durst, C. E.,** Tomato selection for Fusarium resistance. (Abstract.) Phytopath. 8: 80. 1918.—As a result of selection, strains have been developed, from varieties possessing desirable market characteristics, which are capable of living through the season in thoroughly infested soil.—D. REDDICK.

94. **Edgerton, C. W.,** A study of wilt resistance in the seed-bed. Phytopath. 8: 5–14. *Fig. 1–4.* 1918.—Experiments with *Fusarium lycopersici* on tomato in sterilized, reinoculated soil. Seedlings of susceptible strains grown in pots go down very rapidly under such conditions and may be eliminated quickly. The method is as realiable as that of growing plants in the field. Data regarding varietal resistance to disease, virulence of various cultures of the wilt fungus, and the effect of different soils and different substances in the soil on the development of the organisms are presented.—D. REDDICK.

95. **Edgerton, C. W.,** Delayed ripening of tomatoes caused by spraying with Bordeaux mixture. (Abstract.) Phytopath. 8: 69. 1918.—Use of Bordeaux mixture delays ripening of fruit. Financially the control of *Alternaria solani* and *Cladosporium fulvum*, except in epiphytotic years, is more than offset to the market gardener by delayed ripening of fruit.—D. REDDICK.

96. **Faulwetter, R. C.,** The Alternaria leaf-spot of cotton. Phytopath. 8: 98–105. *Fig. 3.* 1918.—A species of Alternaria, perhaps *A. tenuis* Nees., is shown by experimentation to be a weak parasite on the leaves of cotton (*Gossypium* sp.). Under favorable conditions it may attack uninjured leaves but it usually follows in the lesions of *Bact. malvacearum* or injuries by red spider. The lesions are first pale green, later straw yellow and finally rusty brown. They have a brittle, papery texture and irregular, concentric-ridged zonations.—D. REDDICK.

97. **Fernald, H. T.,** White pine blister rust work. Ann. Rept. [Massachusetts] State Nur. Inspector (1917) 16: 3–9. Ja., 1918. [Also in 65th Ann. Rept. Massachusetts State Bd. of Agric..]—Summary of scouting and eradication measures during 1917 and details of plan and organization of the work. Every town in the State has been scouted for cultivated Ribes and all diseased ones (about 30,000) removed. Work was begun too late to do much with

pines. Three eradication areas, covering several towns, were established in and around which all Ribes, whether diseased or not, were destroyed. The condition in Massachusetts is considered serious. During 1916–1917 blister rust has been found on Ribes in 265 towns and on pines in 72 towns. Accompanying maps show pretty general distribution throughout the State but least in the central part.—J. P. ANDERSON.

98. **Fromme, F. D.,** Relative susceptibility of beans to rust. (Abstract.) Phytopath 8: 76. 1918.—Of fifty varieties of beans tested (names not given), most proved susceptible to *Uromyces appendiculatus*, while a few may be classed as rust resistant and a few as very susceptible.—D. REDDICK.

99. **Galloway, Beverly T.,** Some of the broader phytopathological problems in their relation to foreign seed and plant introduction. Phytopath. 8: 87–97. 1918.—An elaboration on three lines of thought, based on the author's intimate acquaintance with the development of the U. S. Dept. Agric. and of Phytopathology in that department, as follows: (1) The work is international; no broad phytopathological problems are local. (2) Regulatory and restrictive measures must be regarded as palliative at best. (3) Plant hygiene, a systematic, organized, coördinated study of crops in their relation to environment offers the broadest field for research and applied science.—D. REDDICK.

100. **Gardner, M. W., and W. W. Gilbert,** Cucumber angular leaf-spot and anthracnose overwintering and seed treatment control. (Abstract.) Phytopath. 8: 79–80. 1918.

101. **Garner, W. W., and D. E. Brown,** Investigations in progress. Tobacco. Maryland Agric. Exp. Sta. Ann. Rept. 30: xix–xx. 1918.—A disease similar to the root rot was found affecting legumes and all Maryland varieties of tobacco. Seeding of "Maryland Mammoth" tobacco was delayed on the infested soil. "Connecticut Broadleaf" is practically immune. —J. B. S. NORTON.

102. **Godfrey, G. H.,** Sclerotium rolfsii on wheat. Phytopath. 8: 64–66. *Fig. 1.* 1918.—Brown lesions on the crown and lower portions of the culm accompanied by a failure to produce kernels. *S. rolfsii* isolated and pathogenicity strongly indicated as a result of inoculation experiments performed on a small scale in greenhouse.—D. REDDICK.

103. **Harter, L. L., and J. L. Weimer,** Storage rots of sweet potatoes. (Abstract.) Phytopath. 8: 73. 1918.—A list of twenty-five organisms that have been tested for ability to produce decay.—D. REDDICK.

104. **Harter, L. L., and J. L. Weimer.** A surface storage-rot of sweet potatoes. (Abstract.) Phytopath. 8: 73. 1918.—Disease is caused by *Fusarium hyperoxysporum* or a closely related species. Infection occurs at digging time apparently through dead or dying rootlets. Lesions develop slowly, are shallow, somewhat sunken, brownish in color and irregular in shape.—D. REDDICK.

105. **Hartley, Carl,** Rhizoctonia as a needle fungus. Phytopath. 8: 62. 1918.—Notes a rare case of *Rhizoctonia* sp. occurring on needles of Douglas fir (Abies) and causing conspicuous, reddish lesions. The organism differs from *Corticium vagum* var. *solani* only in having smaller sclerotia. It is thought to be a parasite but no infection experiments were attempted. —D. REDDICK.

106. **Hopkins, E. F.,** The disease of tulips caused by Botrytis parasitica. (Abstract.) Phytopath. 8: 75. 1918. The disease is widespread in U. S. A. It may be distinguished from other similar diseases by the minute pin-head-sized sclerotia of the pathogene. The organism is a restricted parasite.—D. REDDICK.

107. **Jagger, Ivan C.,** Hosts of the white pickle mosaic disease of cucumber. Phytopath. 8: 32–33. 1918.—The white pickle type of mosaic was transferred to a number of species and numerous horticultural varieties of the family Cucurbitaceae and to *Helianthus debilis* and *Lobelia erinus* var. *gracilis*.—D. REDDICK.

108. **Jagger, I. C.,** Mosaic diseases of cucurbits. (Abstract.) Phytopath. 8: 74–75. 1918.—The white-pickle type of mosaic has been transferred to a large number of species and

varieties in the family *Cucurbitaceæ* and to one species each in the families *Lobelaceæ* and *Compositae*. The mottle-leaf type has been transferred to a few species and varieties of *Cucurbitaceæ*. A third type of mosaic has been found.—D. Reddick.

109. **Jagger, I. C., and V. B. Stewart**, Some Verticillium diseases. Phytopath. 8: 15–19. 1918.—Cultural studies of, and cross inoculations with *Verticillium* sp. isolated from eggplant (*Solanum melongena*), *Berberis thunbergii*, salsify (*Tragopogon porrifolius*), potato (*Solanum tuberosum*) and maple (*Acer rubrum*). Organism is closely related to, but apparenty not, *V. albo-atrum* R. & B. Inoculations also made on various varieties and species of *Solanaceæ*. The cultures from eggplant, barberry, salsify and species of Solanum are indistinguishable in rate of growth, macroscopic appearance, and formation of sclerotium-like bodies. The fungus from maple differs in the rate of formation of sclerotium-like bodies.—D. Reddick.

110. **Jagger, I. C., and V. B. Stewart.** Some Verticillim diseases. (Abstract.) Phytopath. 8: 75. 1918.

111. **Jehle, R. A.,** Susceptibility of Zanthoxylum clava-hercules to Bacterium citri. Phytopath. 8: 34–35. 1918.—Susceptible when organism is introduced in needle prick.—D. Reddick.

112. **Johnson, James,** Wilt disease of tobacco attributed to Fusarium. (Abstract.) Phytopath. 8: 76–77. 1918.—Evidence is presented for believing that the disease is caused by *Fusarium* sp. and not by bacteria, but artificial infection has not been secured.—D. Reddick.

113. **Johnson, James, and B. E. Hartman,** Influence of soil temperature on Thielavia root-rot. (Abstract.) Phytopath. 8: 77. 1918. Root-rot of tobacco occurs sparingly or not at all at temperatures above 23–26°C. Diseased plants transferred to a soil of this temperature or higher temperature develop new roots which are free from disease.—D. Reddick.

114. **Jones, L. R.,** Laboratory outlines in plant pathology. Phytopath. 8: 60–61. 1918. —Review of book by H. H. Whetzel, Lex R. Hesler, Chas. T. Gregory and W. Howard Rankin.

115. **Jones, L. R., W. W. Gilbert, and M. W. Gardner,** Lightning injury to crops. Records of observation. (Abstract.) Phytopath. 8: 80. 1918.

116. **Keitt, G. W.,** Third progress report on investigations of leaf spot of cherries and plums in Wisconsin. (Abstract.) Phytopath. 8: 72–73. 1918.—Spraying experiments show that the disease can be controlled with Bordeaux mixture as weak as 2: 2: 50, and with lime-sulfur solution diluted 1: 40 (Arsenate of lead was used in combination). Certain proprietary sulfur preparations were not so effective. Destruction of fallen leaves before blossoms open helps reduce the amount of disease.—D. Reddick.

117. **Kempton, F. E., and H. W. Anderson,** Quince rot. (Abstract.) Phytopath. 8: 71. 1918.—A fungous disease, but organism not identified. The fruits are first gray, later purplish and finally brown.—D. Reddick.

118. **Lyman, G. R.,** The relation of phytopathologists to plant disease survey work. (Abstract.) Phytopath. 8: 78–79. 1918.

119. **Massey, L. M.,** Experiments for the control of blackspot and powdery mildew of roses. Phytopath. 8: 20–23. 1918.—Use of bordeaux mixture, lime-sulfur solution, cupra-ammonium wash, and sulfur-lead-arsenate dust, on eight varieties, for control of these diseases (caused by *Diplocarpon rosæ* Wolf and *Sphærotheca pannosa* var. *rosæ* Wor.), in well controlled experiments in nursery row and garden. Bordeaux mixture (4: 4: 40) and sulfur-lead-arsenate dust (90: 10) proved decidedly superior for blackspot and the dust mixture much better for control of mildew.—D. Reddick.

120. **Massey, L. M.,** Dry rot of gladiolus. (Abstract.) Phytopath. 8: 71–72. 1918.—A fungous disease. Organism referred to genus Sclerotium. Corms become infected in field and mummify in storage. Lesions are small, more or less circular with a definite margin and of brown to brownish black color.—D. Reddick.

121. **McClintock, J. A.,** Spinach blight. (Abstract.) Phytopath. 8: 74. 1918.—A specific disease, which can be transferred to healthy plants.— D. REDDICK.

122. **McKay, M. B., and Venus W. Pool,** Field studies of Cercospora beticola. Phytopath. 8: 119–136. *Fig. 1–2.* 1918.—*Martynia louisiana* is a new host. The organism is spread to some extent by the air, insects and irrigation water. It is killed by passage through the alimentary tract of cattle, by heating at 100°C. for 30 min. and by ensiling. In sugar beet fields primary infection may come from beet balls or débris of other hosts but chiefly from old beet top material left on the ground from the previous season. Careful removal of infected beet tops after harvest delays the appearance of the disease in non-rotated fields the following season and reduces the injury therefrom. Some American grown seed is heavily infected, lesions appearing on the cotyledons. Treatment with formaldehyde (commercial, 40 per cent) 15: 1000 for 7 min., is effective and not injurious to the seed.—D. REDDICK.

123. **McCubbin, W. A.,** Dispersal distance of urediniospores of Cronartium ribicola as indicated by their rate of fall in still air. Phytopath. 8: 35–36. *2 graph.* 1918.—Spores fell a distance of 8 feet in still air in 4–5 min. Possible distance of dispersal by wind of various velocities is calculated.—D. REDDICK.

124. **Melchers, L. E.,** Botrytis sp. causing severe injury to flowers and foliage of Pelargonium hortorum. (Abstract.) Phytopath. 8: 76. 1918.

125. **Melchers, Leo E., and John H. Parker,** Three varieties of hard red winter wheat resistant to stem rust. (Abstract.) Phytopath. 8: 79. 1918.

126. **Melhus, I. E.,** Seed treatment with hot solutions of formaldehyde and mercuric chlorid. (Abstract.) Phytopath. 8: 81. 1918.—Solutions of formaldehyde and of mercuric chlorid, 2 pints in 30 gal. of water and 2 ounces in 15 gal. of water, respectively, held at 48 to 50°C. for 5 min., have proved fully effective for the control of common scab (Oospora) of potatoes. Oat smut was prevented by treatment for 1 min. with 1 part formaldehyde solution to 320 parts of water at temperatures of 45, 50, 55, and 60°C. Barley stripe disease was practically eliminated by treatment of seed for 5 min. at a temperature of 50°C. with formaldehyde 1: 320 or mercuric chlorid 1: 1000.—D. REDDICK.

127. **Morse, Warner J.,** How to control potato enemies. Quarterly Bulletin Maine Department of Agriculture 18 : 23:40. 1918.—[Reprint of Miscellaneous Publ. 535 of the Maine Agric. Expt. Sta., March, 1918, with the same title but authorship not given.] Enumerates the principal potato diseases known to occur in the state and discusses methods of control.—W. J. MORSE.

128. **Munn, M. T.,** Pathogenicity of Bacillus amylovorus (Burr.) Trev. for blossoms of the strawberry (Fragaria sp.). Phytopath. 8: 33. 1918.—Secured infection by artificial inoculation with atomizer. Disease has not been noted in nature.—D. REDDICK.

129. **Norton, J. B. S.,** Investigations in progress. Botany and plant pathology. Maryland Agric. Exp. Sta. Ann. Rept. 30: vii–viii. Ja., 1918.—Investigations in progress on tomato blight caused by *Septoria lycopersici*; the effect of copper sulfate acting through the root on the resistance of tomatoes to the above fungus; brown rot of peaches; fusarium resistant tomatoes; and the State Plant Disease Survey, are reported. The apothecial stage of the brown rot fungus was abundant after the entire absence of peaches the previous year.—J. B. S. NORTON.

130. **Orton, W. A.,** Organization and correlation of research and extension work in plant pathology. (Abstract.) Phytopath. 8: 78. 1918.

131. **Osmun, A. Vincent, and W. S. Krout,** A new Sclerotium disease of lawn grasses. (Abstract.) Phytopath. 8: 72. 1918.—The disease is primarily one of young grasses, resulting in so-called burning-out. Organism has been isolated and infection secured on *Agrostis alba*, *Phleum pratense*, *Cynosurus cristatus*, *Lolium perenne*, *Trifolium hybridum*, *T. pratens*, *T. repens*, *Melilotus officinalis*, *M. alba*, *Medicago sativa*, and *Vicia* sp.—D. REDDICK.

132. **Potter, Alden A., and G. H. Coons.** The species of Tilletia on wheat. (Abstract.) Phytopath. 8: 72. 1918.

133. **Potter, Alden A., and G. W. Coons.**—Differences between the species of Tilletia on wheat. Phytopath. 8: 106–112. *Fig. 1-4.* 1918.—*Tilletia lævis* (B. & C.) Schrot. (*fœtens*) and *T. tritici* (Bjerk.) Winter are shown to be generally confused in literature, exsiccati, etc. *T. lævis* causes a shortening of the culms of from 6 to 8 cm., heads are small, more slender and open than normal, sori produced only where kernels would be produced, sori oblong, consistency of smut mass unctuous. *T. triciti* causes a shortening of the culm of about 30 cm. heads enlarged, usually all apical florets bear sori, sori elliptic to round, consistency of smut mass friable. The distribution of the two species may account for confusion in regard to certain control measures, soil infestation, destruction of threshing machines, and varietal susceptibility.—D. Reddick.

134. **Potter, Alden A., and Leo E. Melchers,** Resistance of sorghum types to covered kernel smut. (Abstract.) Phytopath. 8: 71. 1918.—None of the commercial types of *Jorghum vulgare* is immune to *Sphacelotheca sorghi*. Milo and feterita are highly resistant, as are a number of the durras and a dwarf kaoliang variety.—D. Reddick.

135. **Ramsey, G. B.,** Influence of moisture and temperature upon infection by Spongospora subterranea. Phytopath. 8: 29–31. 1918.—All combinations of three temperatures (60, 70, and 80° F.) and three conditions of soil moisture (dry, moist and wet) were tried. Soil infested with *S. subterranea*, "Green Mountain" potatoes used. Infection occurred only in the moist and wet cultures at the lowest temperature (five out of six pots).—D. Reddick.

136. **Reddick, Donald [and F. C. Stewart],** Pathological aspects of the freight-rate classification on peaches. Proc. New York Fruit Growers' Assoc. (17th Ann. Meet.) 16: 12–19. 1918.—An essay, outlining investigations in pathology that should be made in order to form a basis for fair settlement of damage-in-transit claims. F. C. Stewart is joint author but his name was arbitrarily omitted by the editor.—D. Reddick.

137. **Reynolds, Harris A.,** White pine blister rust. Published by the Committee on the Suppression of the Pine Blister Russ in North America. Ja., 1918.—A compilation of reports submitted to the committee at the Pittsburgh conference in November, 1917, by those in charge of the blister rust work in the several states, a summary of the situation by H. Metcalf, a report of scientific investigation by Perley Spaulding, and resolutions of the committee. The territory west of the Mississippi river and south of Ohio and Pennsylvania is free of the disease. Only local infections occur in the central western states. In the New England states, New York and parts of Ontario, the disease is pretty generally distributed. The committee recommends continued scouting in the far west to prevent the disease entering, eradication in the middle west and experiments looking toward local control in New England.—P. J. Anderson.

138. **Roberts, John W.,** Plum blotch. (Abstract.) Phytopath. 8: 74. 1918.—*Phyllosticta congesta* Heald & Wolf said to cause the disease. Lesions occur on fruit, leaves and probably the twigs of Japanese varieties of plums.—D. Reddick.

139. **Smith, Loren B.,** Insect transmission of spinach blight. (Abstract.) Phytopath. 8: 74. 1918.—The disease is communicable and is transmitted by several species of insects. —D. Reddick.

140. **Stakman, E. C., and G. R. Hoerner.** Puccina gramini stritici-compacti in southern United States. (Abstract.) Phytopath. 8: 77. 1918.

141. **Stevens, F. L.,** Some meliolicolous parasites and commensals from Porto Rico. Bot. Gaz. 65: 227–229. *Pl. 5-6, figs. 1-5.* 1918.—See abstract under Taxonomy of Non-Vascular Cryptogams.

142. **Stewart, F. C.,** The Phoma blight of red cedar. Phytopath. 8: 33–34. 1918.—Record of the occurrence of *Phoma* sp. on *Juniperus virginiana* in Iowa in 1896.—D. Reddick.

143. **Stewart, F. C., and A. J. Mix,** Blackheart and the aeration of potatoes in storage. New York [State] Agric. Exp. Sta. Bull. 436. Je., 1917.—The fundamental cause of blackheart in potatoes is a lack of oxygen sufficient for the needs of respiration. Blackheart may occur at any temperature above 45°C. provided air is partially or wholly excluded from the potatoes for a sufficient length of time. With a volume of air equal to the volume of the tubers and a temperature of 21°C. confinement of tubers in hermetically sealed jars for 10 or 12 days is sufficient to produce well-marked blackheart. At 12–16°C. about twenty days are required and at lower temperatures a still longer time. The deep piling of potatoes in storage without provision for ventilation is frequently a cause of blackheart.—F. C. STEWART.

144. **Stewart, V. B.,** Dusting experiments in 1917. Phytopath. 8: 63–64. 1918.—Leaf spot of quince caused by *Fabræa maculata* (Lév.) Atk. and leaf-blotch of horse-chestnut, caused by *Guignardia æsculi* (Pk.) Stewart were controlled under conditions of extreme infection with dust mixture consisting of 95 parts finely ground sulfur and 5 parts powdered arsenate of lead. A mixture of 90 parts sulfur and 10 parts hydrated lime was not so satisfactory.—D. REDDICK.

145. **Stone, R. E.,** Orange rust of Rubus in Canada. Phytopath. 8: 27–29. *Fig. 1.* 1918. —Occurrence of *Gymnoconia interstitalis* (Schlect.) Lag. noted on species of Rubus in Canada, especially Ontario. Aeciospore germination figured.—D. REDDICK.

146. **Vaughan, R. E., and J. W. Brann,** Potato seed treatment. (Abstract.) Phytopath. 8: 70. 1918.—Mercuric chlorid loses strength with successive treatments especially when tubers are dirty. Of the varieties tested "Rural New Yorker" was most resistant to *Oospora scabies*.—D. REDDICK.

147. **Walker, J. C.,** Control of neck rot and anthracnose of onion sets. (Abstract.) Phytopath. 8: 70. 1918.—Drying the stock at harvest time at 90–120°F. for 48–72 hrs. is effective —D. REDDICK.

148. **Walker, J. C.,** Notes on the resistance of onions to anthracnose. (Abstract.) Phytopath. 8: 71–72. 1918.—White onions are susceptible whereas red and yellow varieties are decidedly resistant to the anthracnose organism. Coloring matter is in solution in the cells and is easily extracted with water. Such extract inhibits spore germination. There is a close correlation between coloring matter, inhibition of germination and resistance.—D. REDDICK.

149. **Weir, James R.,** New hosts for Razoumofskya laricis. Phytopath. 8:,6–63. 1918.— New hosts are *Picea engelmanni*, *Abies lasiocarpa* and *Pinus albicaulis*.—D. REDDICK.

150. **Weir, James R., and Ernest E. Hubert,** A note on Hyalosporæ. Phytopath. 8: 37–38. 1918.—Evidence to indicate that *Hyalospora polypodii* on *Wodsia scopulina* and *H. aspidiotus* on *Phegopteris dryopteris* are autoecious.—D. REDDICK.

151. **Weir, James R., and Ernest E. Hubert,** Notes on the overwintering of forest tree rusts. Phytopath. 8: 55–59. 1918.—The data presented indicate that *Melampsora bigelowii* on *Salix* spp. *Melampsoropsis pyrolæ* on *Pyrola*, *Melampsoridium betulæ* on *Betula* sp., *Pucciniastrum* spp. on *Epilobium adenocaulon* and *P. pyrolae* on Pyrola, winter over by means of the uredinial stage. It is thus possible to explain the repeated occurrence of these normally heteroecious rusts in regions far removed from their alternate hosts.—D. REDDICK.

152. **Weir, James R., and Ernest E. Hubert,** Cronartium coleosporioides on Pedicularis groenlandica. Phytopath. 8: 63. 1918.—Three genera are now listed as hosts, namely Castilleja, Orthocarpus and Pedicularis.—D. REDDICK.

153. **Weir, James R., and Ernest E. Hubert,** Notes on forest tree rusts. Phytopath. 8: 114–118. 1918.—*Melampsorella elatina* (A. & S.) Arth. in its aecial stage causes harmful witches-brooms and a dwarfing of tips and branches. Cultural studies indicate the *Peridermium coloradense* (Dietel) A. & K. on *Picea engelmanni* is identical with *M. elatina* on *Abies lasiocarpa* and *A. grandis*, the teliospores occurring on *Stellaria borealis*. *Pinus excelsea* is a new host.—*Peridermium holwayi*, *P. ornamentale* and *P. columnare* are considered identical and are referred to *Calyptospora Columnaris*—Aeciospores of *Melampsora artica*

Rostr. On *Abies grandis* produced infection on *Salix scouleriana*. The aecisopores are thickened at one end. The aecial stage may occur on the same needles with *Pucciniastrum pustulatum*.—D. REDDICK.

154. **Western New York Horticultural Society.** Proposed prohibition of the importation of foreign nursery stock. Proc. West. New York Hort. Soc. **63**: 115–117. 1918.—Discussion of U. S. Senate Bill No. 3344. Resolution (p. 120) adopted contains the following: "*Whereas*, there are now few diseases in Europe that have not been brought to the United States, and as only an imaginary line separates the United States from the Dominion of Canada and Mexico, from [sic, (to?)] which countries such plants and seeds may be brought; *Resolved* that the New York State Horticultural Society go on record as opposed to this bill."—D. REDDICK.

155. **Whetzel, H. H.,** The Botrytis blight of golden seal. (Abstract.) Phytopath. **8**: 75–76. 1918.—The disease is destructive to cultivated *Hydrastis canadensis* only in wet seasons. All parts of the host are affected. The organism, *Botrytis* sp., winters as minutes clergotia and as dormant mycelium in the dead petioles.—D. REDDICK.

156. **Whetzel, H. H.,** Latest information on fruit diseases and their control. Proc. West. New York Hort. Soc. **63**: 63–71. 1918.—Apple scab unusually severe. Average of results of growers' experiments in 11 orchards showed scab to be present as follows: untreated trees 54 per cent, sprayed trees 31.6 per cent, dusted trees 31 per cent. Black root-rot of apple, caused by species of Xylaria, is described and distribution noted. Yellow leaf of cherry (*Coccomyces* spp.) abundant but controlled by spraying or dusting. Peach brown rot (*Sclerotinia cinerea*) and scab (*Cladosporium carpophilum*) controlled by dusting. A fruit-gumming of plum, cause unknown, is described.—D. REDDICK.

157. **Wilson, O. T.,** Notes upon a market disease of limes. Phytopath. **8**: 45–50. *Fig. 1–5.* 1918.—A distinctly smooth spot with sharply elevated margin is the best macroscopic character. Diseased fruit has an abnormal odor. The interior tissue is occupied by a filamentous fungus. Repeated attempts to induce sporulation resulted in failure. Dried fragments of mycelium retain vitality and surface inoculations of healthy limes result in characteristic infection.—D. REDDICK.

159. **Wolf, Frederick A., and D. E. Stanford,** A Macrophoma disease of figs. Phytopath. **8**: 24–27. 1918.—Cankers on the larger limbs of *Ficus carica* in North Carolina, caused by *Macrophoma fici* Alm. & S. Cam. Pathogenicity proved by inoculation experiments.—D. REDDICK.

159. **Wolf, F. A.,** Tobacco wildfire. North Carolina Agric. Extension Service Circ. 61. *4 p.* 1918.—Popular account of a tobacco leaf-spot disease reported in full in Jour. Agric. Res. **12**: 449–459. 1918.

160. **Zimm, L. A.,** A wilt disease of maples. (Abstract.) Phytopath. **8**: 80–81. 1918.—The disease is caused by a species of Verticillium but not *V. albo-atrum*. *Acer saccharum*, *A. rubrum* and *A. platanoides* were inoculated and typical wilt produced. The young shoots lost their leaves after several weeks and by the end of summer the twigs were dead. Mycelium was found in the tracheae of the wood and in the leaf petioles.—D. REDDICK.

PHARMACOGNOSY

HENRY KRAEMER, *Editor*

161. **Mueller, N. R.,** The cultivation of Hyoscyamus. Jour. Amer. Pharm. Assoc. **7**: 127–8. 1918.—A discussion of the results obtained from the cultivation of henbane, grown at the Pharmaceutical Exp. Sta., Department of Pharmacy, Univ. of Wisconsin. Directions are given for the selection of proper field for the cultivation of henbane, methods of planting seed, care of the growing plants and methods for collection of the drug. Chemical assays of the leaves of the second year's growth of biennial henbane showed a total of 0.07 per cent of alkaloids, while the leaves of the first year's growth grown from the same seed gave 0.067 per

cent. It is evident from these assays that the activity of the d ug is about the same whether collected from the first or second year plant.—A. HOGSTAD, JR.

162. **Holmes, E. M.,** Note on Euonymus atropurpureus. Pharm. Jour. 100:88. 1918.—A bark, rejected as not genuine root bark of *Euonymus atropurpureus*, consisted of about one part of genuine Euonymus bark and seven parts of a false bark. The false bark possesses numerous transverse scars, medullary rays three cells wide and large yellowish secretion cells. The transverse fracture does not show tangential striation of the liber nor the delicate gummy caoutchouc-like threads so characteristic of the true bark. Also the true bark is somewhat scaly externally, with slight longitudinal ridges and no transverse scars, and the medullary rays are but one cell wide. The false bark bears a resemblance to the bark of *Ptelea trifoliata* but the medullary ray cells of the latter bark are filled with sphaerapides, which do not occur in the medullary rays of the false Euonymus. This false bark is not identified. Criticism is made that the description of Euonymus bark in the British Pharm :copoea is inadequate.—E. N. GATHERCOAL.

163. **Youngken, H. W.,** Wafer ash as an adulterant for Euonymus. Amer. Jour. Pharm. 91: 160–165. 1918.—The two barks somewhat resemble each other but the fracture of wafer ash bark is short, the surface being pale yellow and waxy. The structure of each of the two barks is illustrated by microphotographs. The author was unable to note the bast fibers in Euonymus as described in the N. F.—A. HOGSTAD, JR.

164. **Zufall, C. J.,** The histology of Castela nicholsoni. Jour. Amer. Pharm. Assoc. 7: 166–169. 1918.—This plant is a small shrub of the family Simarrubaceae, found in the West Indies and Mexico. In American medicine and pharmacy it is generally known as *Chaparro amargoso* and is used chiefly in the treatment of amebic dysentery. The macro- and microscopical structures are fully described and illustrated.—O. A. FARWELL.

165. **Sievers, A. F.,** Poisonous plants as sources of insecticides. Pharm. Era 51: My. 1918.—The author discusses the effectiveness, availability and supply of poisonous plants as sources of insecticides. Insecticides should meet the following general requirements; (1) efficiency, (2) harmlessness towards the material on which it is used, (3) cheapness, (4) ease of application. Some well recognized plant insecticides, such as extract of tobacco leaves, quassia and insect flowers, are limited to a very small field or to a small class of insects. The qualifications which a plant must possess in order to make its use in the form of an insecticide practicable are (1) effectiveness, (2) technique necessary to make the material applicable, (3) availability and supply. Effectiveness is determined first by laboratory tests involving the action of the powder direct or in sprays upon insects, then in the form of water extracts with or without the application of heat. Field tests are finally made. Some organic solvent is generally necessary in extracting the toxic material, and the question of expense is important. Water will not, as a rule, redissolve toxic extracts obtained by the use of organic solvents. A method is suggested whereby the toxic substances are brought into very concentrated solution in some suitable organic solvent and this concentrate then mixed with a large quantity of water, the procedure resulting in a fine precipitation, which, by shaking can be held in suspension while being applied as a spray. Plant material otherwise satisfactory as an insecticide must be available in large quantities in order to be of practical importance. Leaves and branches are more desirable than roots, for the former are more convenient, less expensive to collect and may be procured without material injury to the plant. The size and duration of the plant should also be taken into consideration in choosing material for collection. The practicability of cultivating a plant for insecticidal use depends upon (*1*) extent of area suitable for growing it; (2) labor required; (3) margin of profit.—H. W. YOUNGKEN.

166. **Holm, T.,** Cissampelos pareira L. Merck's Rept. 27: 7–9, 60–61. 1918.—This is a vine of the Menispermaceæ, widely dispersed in the tropics of both hemispheres. It is official in the Addendum of the British Pharmacopoeia as *cissampelos* in distinction from the root of *Chondrodendron tomentosum*, R. and P., which is also official as *pareira*. The use of the name *pareira* both as a specific name and as a pharmaceutical title, in addition to its local use as a vernacular name, has led to more or less confusion. Besides the two species mentioned

above there is a third of unknown origin (supposed to be a Menispermum) which produces drugs met with upon the American market under the name of *pareira brava*. Cissampelos has a long slender rhizome and very long roots. No macroscopical description of this drug is given, nor are characters pointed out by which it can be distinguished from the other closely related drugs, substitutes or adulterants. The distinguishing characters of the aerial parts and the histological structure of these, as well as of the drug, are fully described and figured. —O. A. Farwell.

167. **Zörnig, H.**, Simaruba bark of commerce. Seperatabdruck aus den Verhandlungen der Schweizerischen Naturforschenden Gesellschaft 99. Jahresversammlung, (1917).—There are three commercial grades of Simaruba bark in the drug markets; (1) Orinoco bark; (2) Maracaibo bark; and (3) Guiana (Dutch) bark. The latter goes entirely to Holland and is the same as the Orinoco form, which comes through Ciudad, Bolivia and is *Simaruba amara*, Aublet (*S. officinalis*, D. C.) The Maracaibo bark is different from the Orinoco bark both macro- and microscopically and does not come from any species of the genus Simaruba. A comparison of this bark with that of species of various other genera proves it to be derived from some species of the genus Simaba.—O. A. Farwell.

168. **van der Wielen, H.**, Pharmaceutical cinchona bark. De Indische Mercuur (through C. and D.); 90, 211. 1918.—Cinchona bark for pharmaceutical preparations should be valued, not on the quinine content alone, but on the total alkaloids, the nature of these and the kinds of acids present. *Cinchona succirubra* bark cultivated in Java has apparently deteriorated somewhat, but that from British India is less likely to have altered, and the total alkaloids from Indian succirubra bark have an especial antimalarial value. The proposal to utilize *Cinchona robusta* bark, of Java, in place of the *C. succirubra* bark should receive further careful consideration from the point of view of their relative therapeutic value and also as to the best method of making effective galenical preparations from them. Succirubra bark contains very little quinine but is rich in cinchonine and amorphous alkaloids while robusta bark is richer in quinine and especially so in cinchonidine.—E. N. Gathercoal.

169. **Youngken. H. W.**, Pharmacognosy of aloes. Pharm. Era. 51: 119–120, 122. 1918.—Full descriptions of the species yielding the commercial varieties are given. The histology of the leaves of these species is said to be identical and is fully described; also the various methods employed in collecting the juice and in producing therefrom the commercial varieties of aloes, the individual characters of each being enumerated and methods for distinguishing one from another rather fully dwelt upon.—H. W. Youngken.

170. **[Anon.]**, Japanese insect flowers. Chem. and Druggist 90: 231. 1918 [Editorial.]—The first plantations of insect-flowers were made in Japan in 1885 from seed of the genuine Dalmatian plant *Chrysanthemum cinerariaefolium*. Since the outbreak of the war, the industry in Japan has rapidly grown. The total exports in 1917 exceeded 30,000 cwt. The flowers are of the "open" or "half open" grade and are inferior to the former best Trieste grades—E. N. Gathercoal.

171. **Smith, H. G.**, Melaleuca resin. Chem. and Druggist 90: 14. 1918.—The outer bark of *Melaleuca uncinata* contains 23 per cent of resin, which is orange-brown, semi-transparent, very brittle, readily soluble in alcohol, ether-alcohol and acetone, but slightly soluble in chloroform and benzene and insoluble in turpentine, even at boiling. The chief consistuent is resin acid, $C_{17}H_{28}O_4$, which melts at 148–150°C. and in alcoholic solution gives a deep-green color, precipitating with ferric chloride. A piece of the bark, ignited at one end will continue to burn like a candle until consumed.—E. N. Gathercoal.

172. **Phillips, E. P.**, Buchu production in south Africa. Chem. and Druggist 90: 31–32. 1918.—The leaves of *Barosma betulina*, *B. crenulata*, *B. serratifolia* and other species of Barosma are considered. A discussion and comparison involving the botany of these leaves and their chemistry and medicinal uses; the manner of collecting and curing the leaves to form the drug buchu; adulterants, distillation and commercial distribution of the drug; exports and prices and a summary of the literature on the subject. Since the imposition, by the U. S. Government some years ago, of a tax on the gathered leaves the quantity exported

has markedly decreased (1912, 223,000 lbs.; 1916, 130,000 lbs.) and the price has increased (1909, 8 d. per lb.; 1916, 3 s. 3 d. per lb.). The advantage of cultivating the various species of *Barosma* yielding drug is presented, as also the collection of the leaves at the right season, the perfect curing of the drug, and the proper grading of consignments.—E. N. GATHERCOAL.

173. [Anon], Quinine wanted in Siam. Chem. and Druggist 90: 130. 1918. [Editorial].—Recorded deaths from fevers in Burma far exceed those from any other known cause, and malarial fever incapacitates many thousands for weeks and months. More than 10 million quinine tablets were made and sold in 1916 by the Burmese government; but recently the supply of quinine has become limited, new dies for the tablet machines are hard to obtain and even cartridge paper for wrapping the packages is unobtainable from India, so that the demand far outruns the supply. In addition, speculators buying government quinine and selling at great profit across the border in Siam have been reported. The demand for Siam is insistent and might profitably be met from Great Britain after the war is over.—E. N. GATHERCOAL.

174. **Pool, R. J.**, A chart on general plant histology and physiology. Trans. Amer. Microsc. Soc. 37: 53–58. *Pl. 6.* 1918.—Emphasizes the use of a chart to express graphically to beginners some interrelations between histology and physiology.—DUGGAR. (St. Louis).

PHYSIOLOGY

B. M. DUGGAR, *Editor*

175. **Blackman, V. H., and S. C. Paine**, Studies in the permeability of the pulvinus of Mimosa pudica. Ann. Bot. 32: 69–85. *Fig. 1–5.* 1918.—An excised pulvinus of *Mimosa pudica* immersed in warm water with the internal tissues exposed contracts on stimulation, indicating that the loss of turgor cannot be explained by a sudden increase of permeability of the tissues allowing a rapid exosmosis. The exosmosis of electrolytes was studied by the change of the electrical conductivity of the immersion water in a specially constructed conductivity cell, showing that contraction is associated with increased exosmosis. This increase is too small to account for the sudden loss of turgor, which is probably due to the disappearance or inactivation of a considerale part of the osmotic substances of the cells.—Experiments show that since the conductivity method is direct it is superior to the indirect plasmolytic method for the study of the effect of light on permeability. By use of the former it was shown that in the pulvinus the permeability of the cells for electrolytes is increased by exposure to light, but the stimulation rapidly decreases with time. A sudden change from light to darkness also increases permeability. Independent contractions of the pulvinus occurred at gradually decreasing intervals, so that, the time for the recovery becoming less and less, the contractions also decrease in extent, and the pulvinus at the end of the series remained in the contracted státe.

Below 50°C. a slow rise of temperature has little effect on the rate of exosmosis. At higher temperatures increased permeability is probably due to lethal changes.—ZELLER (St. Louis).

176. **McCall, A. G., and P. E. Richards**, Mineral food requirements of the wheat plant at different stages of its development. Jour. Amer. Soc. Agron. 10: 127–134. *Pl. 2–3; fig. 22–23.* 1918.—Three stages in the development of the wheat plant are considered and thirty-six proportions of mono-potassium phosphate, calcium nitrate, and magnesium sulphate were used, in washed quartz sand in culture pots arranged on rotating tables with special irrigating devices. The results indicate that the most favorable proportions remain constant for the first two growth periods, each of thirty days; but for the final growth period—from 60 days old to maturity—the favorable proportions are materially changed. A relatively lower magnesium ratio is required at first.—DUGGAR (St. Louis).

177. **Winslow, C. E. A., and I. S. Falk**, Studies on salt action. I. Effects of calcium and sodium salts upon the viability of the colon bacillus in water. Proc. Soc. Exp. Biol. and Med. 15: 67–69. 1918.—A study of the viability curve, the results of which indicate that for

this bacillus the effects of these salts and their antagonistic influence yield data analogous to those obtained with higher organisms.—DUGGAR (St. Louis).

178. **Wolkoff, M. I.,** Effect of ammonium sulfate in nutrient solution on the growth of soy beans in sand cultures. Soil Science 5: 123–150. *Fig. 1–7.* 1918.—Substituting ammonium sulfate for potassium nitrate in Tottingham's nutrient solution it was found that the former gave increased growth up to a certain limiting concentration. Growth in these experiments was measured by several criteria.—DUGGAR (St. Louis).

179. **Hills, T. L.,** Influence of nitrates on nitrogen-assimilating bacteria. Jour. Agric. Res. 12: 183–230. 1918.—This paper considers the effects of nitrates on the growth of Azotobacter and their relation to pigment production and to the formation of volutin bodies; likewise the effects on the growth of *Bacillus radicicola* in culture, and as influencing nodule development. The usual technique was followed and in general the results indicate that, while the growth of both organisms is promoted by nitrates in low concentration, Azotobacter responded more markedly to their presence and is more resistant to higher concentration. At the same time pigmentation of Azotobacter increases with concentration of the nitrate. Large amounts of any nutrient nitrate tested proved detrimental to the formation of nodules on alfalfa.—DUGGAR (St. Louis).

180. **Burling, H. A., and M. Levine,** Concentration of glucose and lactose and viability of coli-like bacteria. Amer. Jour. Publ. Health 8: 306–307. 1918.—Adding 0.5 per cent glucose to a medium consisting of 0.5 per cent peptone and 0.5 per cent di-potassium phosphate in distilled water, *Bacillus coli*-like organisms multiply rapidly during the first ten hours, but within 48–96 hours die off rapidly; whereas *B. aerogenes* and *B. cloacae* persist in undiminished numbers. Glucose of 0.3 per cent concentration is not injurious to *B. coli* in the same interval, while 1 per cent induces more rapid death. Lactose gives practically analogous results. The results show the necessity of reducing the concentration of lactose in preliminary enrichment media. An explanation may perhaps relate the phenomenon to change in hydrogen-ion concentration.—DUGGAR (St. Louis).

Kidd, F., Translocation in plant tissues. New Phytol. 17: 44–45. 1918.—The author questions the validity of the physical chemical concepts of Mangham in a paper on this subject (Ann. Bot. 31: 293–311. 1917).—DUGGAR (St. Louis).

181. **Long, W. H., and R. M. Harsch,** Pure cultures of wood-rotting fungi on artificial media. Jour. Agric. Res. 12: 33–82. 1918.—Many physiological cultural characters were studied by means of pure cultures of various wood-rotting fungi grown on agar prepared with vegetable decoctions derived from ten different sources. Extensive tables are given showing the influence of the substrate, of sunlight, and of other conditions on vegetative characters; likewise the effects of a variety of conditions on the character of sporophore formation; and throughout the whole there has been kept in mind various criteria which might be of value in the differentiation of the species and strains of organisms employed.—DUGGAR (St. Louis).

182. **Bioletti, F. T., W. V. Cruess, and H. Davi,** Changes in the chemical composition of grapes during ripening. Univ. California Publ., Agric. Sci. 3: 103–130. *Fig. 1–11.* 1918.—The composition of grapes was studied both during the period of growth and of ripening, and determinations were made of total solids and sugar, total and free acid, potassium tartrate (cream of tartar), and protein. While total sugar follows closely the total solids curve during ripening, the total and free acid decrease rapidly during ripening. In the early stages of growth, however, acidity increases due to an increase of free acid.—DUGGAR (St. Louis).

183. **Dox, A. W.,** Amino acids and micro-organisms. Iowa Acad. Sci., Proc. 24: 539–545. 1917. [Distributed, 1918.]—Collates the decomposition of amino acids as effected by yeasts and bacteria.—DUGGAR (St. Louis).

184. **Hasselbring, H.,** Behavior of sweet potatoes in the ground. Jour. Agric. Res. 12: 9–17. 1918.—An investigation showing changes in water, sugar, and starch content of sweet potatoes during the latter part of the growing season whereby it appears that there is increased

water content practically coincident with the destruction of the leaves, whereas a constant total carbohydrate content is maintained, although there is a gradually decreasing starch and increasing cane sugar content during the latest stages examined—as under storage conditions, previously reported.—Duggar (St. Louis).

185. **Allen, P. W.**, A simple method for the classification of bacteria as to diastase formation. Jour. Bact. 3: 15–17. 1918.—To standard agar is added 0.2 per cent of water soluble starch. After sterilization in the autoclave, Petri dishes are poured, hardened, and a streak inoculation with the organism is made. After a special incubation treatment, the culture is flooded with alcoholic iodine to determine if starch hydrolysis has occurred.—Duggar (St. Louis).

186. **Corper, H. J., and H. C. Sweany**, The enzymes of the tubercle bacillus. Jour. Bact. 3: 129–151. 1918.—Employing to some extent new methods, the authors report autolytic enzymes for both the human and bovine varieties of the tubercle bacillus. The bacilli or autolyzates possess trypsin-like, erepsin-like and pepsin-like enzymes, also a nuclease and urease, but they do not possess carbohydrate enzymes, so far as investigated, nor enzymes capable of digesting certain elastic tissues.—Duggar (St. Louis).

187. **Falk, I. S., and C. E. A. Winslow**, The effect of potassium bromate upon enzyme action. Jour. Biol. Chem. 23: 453–462. 1918.—It is found that potassium bromate, in concentrations of one part in 100,000–200,000, consistently stimulates the digestion of casein by trypsin *in vitro*. The casein-trypsin solutions were made by adding definite amounts of these substances to a mixture of dibasic and monobasic potassium phosphates with a P_h value 7.1. Considerably higher concentrations of the bromate are slightly inhibitive. A slight stimulative action of the bromate on the digestion of casein by pancreatin was also found.—Duggar (St. Louis).

188. **Long, E. R.**, Further results on desiccation and respiration of Echinocactus. Bot. Gaz. 655: 354–358. *Fig. 1.* 1918.—An Echinocactus loaded with carbohydrate through desiccation for eight months in the open was placed in a dark chamber in order to follow catabolic changes and water balance. As anticipated, water was lost more uniformly in the dark chamber, but after 22.5 months one plant had lost 57 per cent of its original weight, 12 per cent while in darkness. Under the last mentioned condition soluble sugars disappear rapidly this disappearance being accompanied by the development of high acidity. At this stage the destruction of polysaccharids had scarcely begun, and the total hydrolizable carbohydrate was hardly less than normal. Destruction of the latter does occur after confinement without photosynthesis for years, and this breaking up of stable substance in conjunction with resistance to desiccation explains the great viability of this plant in spite of prolonged starvation.—Duggar (St. Louis).

189. **Child, C. M.**, Physiological senescence in Hydromedusae. Marine Biol. Bull. 34: 49–63. 1918.—In consideration of much recent work on plants as well as animals the author's findings are important in showing that with advancing development there are correlated certain progressive changes in behaviour and susceptibility, indicating a change of physiological state. It is concluded that a decrease in the rate of oxidation is a characteristic of these forms as well as of other animals previously studied.—Duggar (St. Louis).

190. **Gerecke, W. F.**, Effects of rest and no-rest period upon growth of Solanum. Bot. Gaz. 65: 344–353. 1918.—Among the differences noted in the growth from the two series of potato tubers are these, (1) that the no-rest tubers produced one-stalked plants, (2) that these plants had a longer growing period than those from tubers given a normal rest, and (3) that recovered tubers of the no-rest series which were planted a second time exhibit a germination of several buds, these appearing above ground in about the same period as those from normal rest-period tubers.—Duggar (St. Louis).

191. **Hodgson, R. W.**, An account of the mode of foliar abscission in citrus. Univ. California Publ., Bot. 6:, 417–428. *Fig. 1–3.* 1918.—The mode of abscission conforms to the usual type. With regard to physiological phenomena, there is a well defined swelling and gelatini-

zation of the cell wall followed by dissolution through hydrolysis, all cells in the zone of abscission exhibiting swelling and gelatinization, but resuming cell division after separation, thus leading to the formation of clusters of clavate cells held by a portion of the gelatinized wall. Starch is stored in the abscission zone and later used in growth.—DUGGAR (St. Louis).

192. **Le Goc, M. J.**, Effect of foreign pollination on Cycas Rumphii. Ann. Roy Bot. Gard. Peradeniya 6: 187–194. *Pl. 13.* 1917.—Indications are given to the effect that, under the influence of germinating pollen from related genera, the ovules of *Cycas Rumphii* are stimulated to grow to normal size, but as they contain no embryos no true fertilization can have occurred. —DUGGAR (St. Louis).

193. **Rigg, G. B.**, Growth of trees in sphagnum. Bot. Gaz. 65: 359–362. 1918.—Data have been accumulated in the Puget Sound and Alaska regions showing that various species of conifers exhibit a rate of growth in sphagnum which is only from 33 to 64 per cent of the rate in other habitats of the same region. No deciduous plants of the dimension of trees are found in sphagnum in that locality. Toxicity of the substratum is considered a chief factor in the inhibition of growth.—DUGGAR (St. Louis).

194. **Sasscer, E. R., and A. D. Borden**, Fumigation of ordinary greenhouse plants with hydrocyanic acid gas. U. S. Dept. Agric., Farmers' Bul. 880: 1–20. *Fig. 1–4.* 1918.—Gives extensive tables, showing resistance of host plants, as well as insect pests, to the gas.—DUGGAR (St. Louis).

195. **Teague, O.**, The toxicity of Victoria blue 4-R for *Bacillus paratyphosus* A, *B. paratyphosus* B, and *B. enteritidis*. Jour. Bact. 3: 1–6. 1918.—*Bacillus paratyphosus* B exhibits differential sensitiveness to the toxicity of the dye mentioned.—DUGGAR (St. Louis).

196. **Jörgensen, I., and W. Stiles**, The electroculture of crops. Sci. Prog. 12: 609–621. 1918.—This is a very general review of the literature on this subject which reveals an ever-recurring cycle of experiments having as their object the proof or disproof that the electric discharge has a beneficial effect on vegetation, and which shows that the method of inquiry is fundamentally wrong due to a neglect of quantitative measurements of the discharge and a lack of knowledge of plant physiology. The advances made thus far have come from the physicist, but there is now a sounder outlook for this field through researches by those familiar with the physiology of plants.—ZELLER (St. Louis).

197. **Shelford, V. E.**, Physiological problems in the life histories of animals with particular reference to their seasonal occurrence. Amer. Nat. 52: 129–154. 1918.—Although strictly an animal problem the data accumulated are of interest to the plant physiologist on account of the experimental work establishing the relation of seasonal variations to changing factors of the environment. In general the results indicate that explanations of variations are related to the sum of factor changes.—DUGGAR (St. Louis).

198. **Weston, W. H.**, The development of Thraustotheca, a peculiar water-mould. Ann. Bot. 32: 155–173. *Pl. 4–5; fig. 1–2.* 1918.—A morphological paper indicating certain physiological aspects of reproduction such as (1) the influence of environment on the germination of sporangiospores and on gemmae formation, which represent merely a transient resting state induced by unfavorable environmental conditions, and (2) the influence of nutrition on the type of development from oospores.—ZELLER (St. Louis).

199. **Bancroft, W. D.**, Outline of colloid chemistry. I–III. Jour. Franklin Inst. 185: 29–57, 199–230, 373–387. 1918.—A series of physical-chemical papers, fundamental in character, dealing with adsorption phenomena, catalytic action and the preparation of colloidal solutions.—DUGGAR (St. Louis).

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

200. MacCaughey, V., Algae of the Hawaiian Archipelago. Bot. Gaz. **65**: 42–57, 121–149. 1918.—The results of extended studies on the algal flora of the Hawaiian Islands, covering a period of ten years and extending to all the larger islands of the Archipelago, are given in the present paper. In part I, the author gives a brief review of previously published work, and then presents the results of his studies on certain ecological aspects of the subject. Particular attention is given to the relatively rich flora of the coral reefs on the islands of Kauai and Oahu, on the typical fringing types of which the author recognizes five distinct zones or areas of plant and animal life; characteristic species of the zones are given in nearly all cases. Rockweeds, kelps, and laminarias, so conspicuous on colder coasts, are notably absent from the Hawaiian flora. Of particular interest are the coralline, or lime-secreting, algae on the reefs, especially abundant among these being representatives of Lithothamnion, Corallina, and Mastophora. The author reports the coralline forms from shallow waters as well as from waters of considerable depths, and regards them as undoubtedly contributing in a large degree to reef building. In the fresh water forms, particular attention is given to irrigated regions, ditches and flumes, mouths of volcanic caves, mountain streams, hot springs and thermal waters, summit bogs, and coastal brackish waters; representative species are listed for most of these habitats. No studies were made on the phytoplankton.

In striking contrast with the terrestrial flora, the algal flora of the islands, so far as the author can judge in the present incomplete state of knowledge, contains few endemic species, most of the forms being cosmopolitan or at least widely distributed in the tropics and subtropics. A list of probable endemic species is given. In part II the author lists practically all known species of Hawaiian algae, the list being based on his own observations as well as upon all available published records. Brief characterizations of the forms are given, as well as notes on distribution, habitat, and economic uses. No new species are described.—SCHRAMM.

201. White, J. W., Notes supplemental to the flora of Bristol. Jour. Bot. **56**: 77–87. 1918. —Four species of *Nitella* and *Chara* are listed.—SCHRAMM.

202. Howe, R. H., A further note on the lichens of Nantucket. Rhodora **20**: 40. 1918.

203. Harper, E. T., Two remarkable Discomycetes. Bull. Torr. Bot. Club **45**: 77–86. *Pl. 1–3.* 1918.—*Underwoodia columnaris* Peck, described by Peck as stemless and everywhere acigerous, and placed by Schroeter in the family Rhizinaceae, was collected several times by the author in Michigan. The specimens show the presence of a short stem, and, furthermore, naked strips extending upward for short distances into the hymenium. The author has rewritten Peck's description to include the newly-found characters. The species is regarded as representing a monotypic genus showing no close affinities with any known discomycete. The author also gives critical notes on *Pustularia gigantea* Rehm.—SCHRAMM.

204. Ichimura, T., A new poisonous mushroom. Bot. Gaz. **65**: 109–110. *Fig. 1–3.* 1918.—A new species of Clitocybe, *C. acromelalga*, is described from a bamboo forest in Tsurugiji Noto, Japan.—SCHRAMM.

205. Stevens, F. L., Some meliolicolous parasites and commensals from Porto Rico. Bot. Gaz. **65**: 227–249. *Fig. 1–5, pl. 5–6.* 1918.—Two new genera of the Moniliales—Isthmospora and Grallomyces—are described with *I. spinosa* as the type species of the former and *G. portoricensis* as the type species of, the latter. In addition, there are described as parasitic on, or associated with, species of *Meliola*, the following new species: *Perisporium paulliniæ*, *P. meliolæ*, *Pseudonectria pipericola*, *Nectria meliolicola*, *N. portoricensis*, *Calonectria graminicola*, *Paranectria meliolicola*, *P. miconiæ*, *Næmosphæra hyptidicola*, *Coniothyrium glabroides*, *Acremonium meliola*, *Arthrobotryum dieffenbachiæ*, *A. glabroides*, *Helminthosporium glabroides*, *H. guareicolum*, *H. ocoteæ*, *H. melastomacearum*, *H. panici*, *H. parathesicolum*, *H. philodendri*, *H. helleri*, *Isthmospora glabra*, and *Fusarium meliolicolum*. *Arthrobotryum penicillium* appears as a new combination. Notes on a number of described species of

meliolicolous parasites are given, together with an alphabetical list of the species of Meliola and the fungi found upon them.—SCHRAMM.

206. Zeller, S. M. and C. W. Dodge, Rhizopogon in North America. Ann. Missouri Bot. Gard. 5: 1–36. *Pl. 1–3.* 1918.—The following new species of Rhizopogon are described from North America: *R. maculatus, R. viridis, R. pannosus, R. diplophlœus, R. pachyphlœus, R. occidentalis. R. roseolus* appears as a new combination. Among the at present extra-limited species, *R. angustisepta* and *R. rubro corticeus* are described as new. Among excluded species *Hydnangium aurantium* appears as a new combination. Critical notes on described species are given, as well as a key to the North American species of the genus.—SCHRAMM.

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GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

207. Allard, H. A., Abnormalities in Nicotiana. Bot. Gaz. **65**: 175–185. Feb., 1918.—Synanthy or coalescence of normally separate flowers appeared in plant of *N. alata* Link and Otto (*N. affinis* Moore). As these abnormalities are more or less hereditary, predisposing cause is associated with germ plasm.—Reviews previous work on catacorolla; cites evidence that in some cases this is hereditary. Catacorolla is often associated with mosaic disease in *N. tabacum*, while other species of tobacco, as *N. glauca*, *N. longiflora*, *N. silvestris*, and *N. alata*, also petunias and *Datura stramonium*, which are readily affected with this disease, rarely if ever develop such abnormalities.—Development of two growing points in young plants of F_1 between Maryland Mammoth and Yellow Pryor tobacco is mentioned. Tendency was noted in Maryland Mammoth to develop bifurcation of the main stem. This feature, however, usually appears rather late in development.—Variations in number of corolla lobes and stamens are cited and evidence is presented which shows that corolla lobes and stamen number are same in most instances.—H. K. HAYES.

208. Anthony, S. A., An anomaly of wheat anthers. Jour. Heredity **9**: 166–168, *2 fig.* Apr., 1918. Author cites anomaly of anthers of wheat grown in greenhouse of U. S. Department of Agriculture, differing from usual types of phyllody.—Only half of sporophyll is transformed, and not into leaf or petal, but into a process bearing stigma hairs. Author thinks abnormal physical factors in greenhouse may have had causative bearing.—HERBERT BEAUMONT.

209. Babcock, E. B., The rôle of factor mutations in evolution. Amer. Nat. **52**: 116–128. Feb.-Mar., 1918.—Author refers particularly to work of Morgan and others upon *Drosophila ampelophila* as proof that factors undergo definite alteration, and holds that such alterations or "factor mutations" are sufficient to explain origin of all differences between varieties and races. Author points difficulties in attempting to account by factor mutations for origin of species which have different chromosome numbers. Those which have same chromosome number, but which differ from each other in many characters may readily have originated by factor mutation, by one of following methods: (*a*) One factor mutation may have manifold somatic effects, as in author's oak-like walnut and its parent, the California black walnut, but factor mutations which induce such extensive somatic changes seem to be exceedingly rare. (*b*) Simultaneous mutations may have occurred in several factors, but author regards this extremely doubtful. (*c*) Single factor mutations may have occurred in different individuals of a group, either simultaneously or successively, as evidenced by widespread existence of composite species. Factor mutations not adequate to account for origin of genera and phyla.—P. J. OLSON.

210. **Babcock, Ernest Brown, and Roy Elwood Clausen,** Genetics in relation to agriculture. *15×23 cm., xx + 675 p., 239 fig., 4 colored pl.* McGraw-Hill Book Co, New York. Apr., 1918.—Test-book organized in three parts,—part 1 treating of fundamentals, embodying 286 pages in 14 chapters. Part 2, 155 pages, 12 chapters, shows application to art of plant breeding, and part 3, 170 pages, 13 chapters, devoted to their application in practices of animal breeding.—Deals chiefly with well established facts, distinguishing clearly what is known from unknown, points out problems awaiting solution and offers many helpful and practical suggestions for future work. No attempt is made to outline historical development of genetics or to interpret evolution, discussion of historical theories concerning these topics being entirely omitted. Genetics as applied to human race,—eugenics,—is also omitted. Includes working bibliography of literature, excellent glossary, and index complete and arranged in convenient form.—Part 1, fundamentals: after introduction defining science of genetics and its province, stating problems and methods and relation to other biological sciences, begins with consideration of variation, its relation to hereditary and environmental factors and its measurement. Helpful chapter on biometry gives latest and simplest methods for statistical studies. Chapter on physical basis of Mendelism is concise, clear and adequate, dealing merely with fundamentals necessary to understanding of cell behavior and Mendelian phenomena; details not essential to such understanding are not presented. Following chapters treat of independent Mendelian inheritance, linkage relations, nature and expression of Mendelian factors, allelomorphic relationships, factor interactions, factor relations in quantitative inheritance, inheritance of sex, and related phenomena, species hybridization, principles of pure line breeding, and mutations.—Part 2, plant breeding, gives definite directions and methods for improvement of plants through breeding. Considers materials, varieties in plants, and composition of population; discusses rôle of hybridization, and mutation; considers selection of germinal variations and production of new varieties from bud variations; and treats of graft-hybrids, chimeras, breeding disease-resistant plants, and one chapter is devoted to methods, giving specific instructions for planting, taking data, keeping records, conducting tests, etc.—Part 3, animal breeding, considers in similar way known cases of factor-inheritance in domestic animals and points out practical application of this knowledge to problems of animal breeding; treats general aspects of art of animal breeding, variation in domestic animals, discusses grounds against belief in inheritance of acquired characters, treats of hybridization, selection, disease in relation to breeding, determination of sex, fertility, and gives methods of breeding and of conducting breeding investigations.—E. E. BARKER.

211. **Backhouse, W. O.,** The inheritance of glume length in *Triticum polonicum.* A case of zygotic inhibition. Jour. Genetics 7: 125–133. Feb., 1918.—*T. polonicum,* commonly known as Polish wheat, is distinguished from other wheat species by long glumes which, in extreme cases, attain length of 40 mm. while ordinary wheat has glume length which averages about 10 mm. *T. polonicum* crosses very readily with *T. durum* and *T. turgidum* and shows total lack of sterile individuals in F_2. Glume length is intermediate in F_1 and segregates in F_2 in ratio of 1 long : 2 intermediate : 1 short-glumed, but correct classification requires breeding test.—Author gives result of crosses between smooth-chaffed variety of *T. durum* known as Kubanka with average glume length of 12 mm. and variety of *T. polonicum* with average glume length of 29 mm., and intermediate pubescence. F_1 had intermediate glume length, averaging 18 mm., but was distinctly pubescent. In F_2 segregation into long-, intermediate- and short-glumed individuals was obtained and plants were classified as pubescent, intermediate or smooth. Short-glumed plants produced felted and smooth individuals in ratio 3 : 1. Large percentage of extremely long-glumed F_1 plants showed short velvety pubescence and several were absolutely smooth. Some of these smooth-chaffed individuals were bred following year and proved homozygous for smoothness. Test crosses of several of these smooth lines with Kubanka showed all smooth progeny in some cases and in other cases 3 rough to 1 smooth-glumed in the short-glumed segregates, although in these plants felting was of minor degree.

The author concludes that long glume inhibits expression of dominant character and that furthermore there was direct relation between length of glume and degree of felting.—In crosses between *T. polonicum* and felted, black-glumed variety of *T. turgidum*, closely related to Rivet wheat, similar results were obtained, F_1 being intermediate for glume length and felting and either white or faintly tinged. All fully colored plants which appeared in F_1 had short glumes except one plant with glume length of 16 mm. Evidence for short-glumed plants shows that color is independent of pubescence. Some of the pure lines were then crossed with Kubanka to determine whether they were homozygous for color. Two individuals of five thus tested produced all tinged individuals in F_1, one all white, and two both white and tinged.—Crosses between Rivet and Polish wheat grown in north of Argentine and in England gave all colorless individuals, while in center of Argentine some short segregates were tinged.—Author concludes that combination of factors from Polish wheat and Rivet inhibits color, for this particular strain of *polonicum* crossed with colored varieties, other than Rivet, gives colored descendants, in climatic conditions under which, crossed with Rivet, they are colorless.—H. K. Hayes.

212. **Bell, Alexander Graham,** The duration of life and conditions associated with longevity. A study of the Hyde genealogy. P. 5–57. Genealogical Record Office. Washington, D. C., 1918.—Author selected Hyde Genealogy (published 1864) because it seemed to describe representative sample of the general population. Following data are tabulated: Age at death of propositus and parents; age of parents at birth of propositus; age of parents at marriage; number of years after marriage when propositus was born. Statistical analysis of these data which describe 8787 persons was made.—Of 2965 persons, whose ages at death were known, average term of life was 34.6 years, 35.2 per cent. of these died before 20 years of age; 7.3 per cent. lived to be over 80. Critical periods in lives were: first year of infancy and adolescence (about 23 years). Material showed heredity to be deeply involved in production of longevity, influence of father seeming somewhat greater than that of mother. What is really inherited is probably tough, wiry constitution, which makes attainment of old age extremely significant.—H. H. Laughlin.

213. **Belling, John,** Lethal factors and sterility. Jour. Heredity **9**: 161–165. Apr., 1918.—Classifies lethal factors into (a) those inhibiting development of zygote; (b) those which act on pollen grains and embryo sacs; (c) "Sublethal factors," not always fatal to the zygote or gamete which possesses them. Discusses results of presence of each type of lethal, giving mathematical formulae.—Lethal factors or factor combinations, acting on the pollen grains and embryo sacs (haploid generation) cause selective elimination of pollen grains and embryo sacs, resulting in partial sterility. In semi-sterility one half of gametes of both sexes fail to develop, due to presence of lethal factors or combinations. Examples in Stizolobium crosses and in *Oenothera Lamarckiana*. In former, fertile and semi-sterile plants occur in equal numbers, and in *Oe. Lamarckiana* only semi-sterile plants are produced, these being heterozygotes of an F_1 population.—Author recognizes several distinct causes for empty pollen grains (and aborted embryo sacs): (a) accidents of environment, not usually selective. (b) Inherited zygotic factors usually causing death of small fraction of pollen grains, not usually selective. All or nearly all of pollen may perish by action of zygotic factors, as in sweet peas with empty anthers, such abortion not being selective. (c) Lethal factors, acting on haploid generation causing semi-sterility. In this case elimination is selective, and F_2 ratios are altered. (d) Partial elimination of pollen grains or embryo sacs by sublethal factors. Two or more of these causes may be operative at same time on same plant.—J. L. Collins.

214. **Boas, Helene M.,** The individuality of the bean pod as compared with that of the bean plant. Mem. Torrey Bot. Club **17**: 207–209. June 10, 1918.—Concludes that pods of bean show individuality, represented by intra-locular correlation of about $r = .29$ in thickness—width index of their seeds.—J. A. Harris.

215. **Butler, Arthur G.,** Ancestral characters in nestlings. Avic. Mag. 9: 211–213, 234–237. May–June, 1918.—When nestling differs much in color from parents author thinks it represents earlier stage in history of species, such color is usually more uniform and less brilliant. Adults resembling young represent more ancient type than those differentiated from young. Some males become differentiated by sexual selection. In thrushes males of *Merula merula* and *M. boulboul* differ from females; their hybrid males are less black than either species and with red-brown wing patch; their hybrid females differed, one paler than other, and close to *boulboul* female. Young *M. torquata* and *M. merula* hybrids had throat band varying in shape, but its color in both sexes resembled that of *torquata*.—J. P. Kelly.

216. **Cobb, Frieda, and H. H. Bartlett,** Purple bud sport on pale flowered lilac (*Syringa persica*). Bot. Gaz. 65: 560–562, *1 fig.* June, 1918.—Description of purple bud sport on pale-flowered lilac. Sport occurred on summit of bush ten feet high which had flowered for ten years or more with only pale flowers. Differed from normal in spread of corolla and width of its lobes. In both measurement and color duplicated dark purple cultivated variety. Experiment outlined to test whether a reversion, somatic segregation or periclinal chimaere. —H. K. Hayes.

217. **Cockerell, T. D. A.,** The story of the red sun-flower. Amer. Mus. Jour. 18: 38–47. *14 fig.* Jan., 1918.—Popular account of sport of *Helianthus annuus* used in production of "red-flowered" sunflowers now somewhat widely cultivated as horticultural novelties. Single wild plant was found with carmine sap-pigment in addition to orange coloration common for species. These two pigments together gave rays conspicuous chestnut-red color. On account of self-sterility it was necessary to cross "sport" with plants having yellow flowers. Cross was made with plant having very pale yellow flowers. F_2 of this cross split up into four classes, one of which had flowers with carmine and pale yellow pigments and which were of wine-red color. Author points out that this particular type is to be expected on the theory of recombination of hereditary factors representing characters present in grandparents.—It is also reported that all annual species of Helianthus thus far tested, cross readily, but that F_1 generations are so nearly sterile that they can not be propagated as horticultural novelties. All inter-varietal crosses in *H. annuus* are reported to be fertile. Mention is made of 50 distinct variations in *H. annuus*; several of these are shown among the 14 illustrations. Three interspecific hybrids are mentioned and illustrated.—Special plea is made for more extensive and intensive study of variations and for their utilisation in development of new horticultural forms. Sun-flowers illustrate most concretely results thus attainable.—A. B. Stout.

218. **Coulter, Merle C.,** Hybrid vigor. Bot. Gaz., 66: 70–72. July, 1918. Consists largely of selected paragraphs on same subject from Coulter & Coulter's "Plant genetics," p. 169–176.

219. **De Vries, Hugo,** Mass mutations and twin hybrids of *Oenothera grandiflora* Ait. Bot. Gaz. 65: 377–422. May, 1918—New constant-breeding mutant, called *ochracea*, of *Oe. grandiflora*, occurred repeatedly in high percentage, suggesting mass mutations of Bartlett. Whereas crosses between *grandiflora* and a number of species yield twin hybrids that correspond to those produced by crossing *Lamarckiana* with the same species, crosses between mutation *ochracea* and same species yield uniform progeny. While *grandiflora* crossed with *Lamarckiana* gives triple hybrids (*ovata*, *lutea*, and *brunnea*), mutation *ochracea* crossed with *Lamarckiana* gives only *ovata* and *lutea*. Nature of *grandiflora* is conceived to be due to secondary mutation, producing typical and *ochracea* gametes in equal numbers. Typical species corresponds to 50 percent class in F_2 of Mendelian monohybrid case, mutation *ochracea* to one of the smaller classes, other smaller class being destroyed by lethal factor in close linkage with normal *grandiflora* gametes. *Lamarckiana* does not by itself produce twin hybrids because of second lethal factor closely linked with *laeta* in its gametes. Triple hybrids from *grandiflora* × *Lamarckiana* are derived thus: *brunnea* from typical *grandiflora* × *velutina* gamete of *Lamarckiana*; *lutea* from *ochracea* × *velutina*: *ovata* from (typical *grandiflora* + *ochracea*) × *laeta* of *Lamarckiana*. Triple hybrids are constant in that none of them splits off either of the others, but secondary differences occur.—A. F. Shull.

220. **East, E. M.,** Amer. Nat. **52**: 366-368. June-July, 1918.—Review of Babcock and Clausen's "Genetics in relation to agriculture."

221. **Freeman, G. F.,** Producing bread making wheats for warm climates. Jour. Heredity **9**: 211-226. May-June, 1918.—Study of inheritance of seed texture through four generations is given. Crosses studied were made between white macaroni wheat (No. 1), soft red bread wheat (No. 3) and soft white wheat (No. 35). Difference in texture of translucent macaroni seeds and opaque seeds of soft wheats lies in proportion of gluten to starch and their behavior in ripening. Thin sections of seeds were made without changing their physical character by grinding and polishing in a manner similar to that used by petrologists in making sections of minerals. Transmitted light causes opaque portions of soft seeds to stand out as these portions are due to air spaces.—Crossed seeds were intermediate in texture. Seeds of F_1 plants (F_2 endosperm) ranged from soft to translucent hard without exhibiting definite classes. Pure hard- and pure soft-seeded plants were obtained in F_3 endosperm, and bred true in following generation. Plants with large proportion of one extreme produced seeds ranging toward that extreme.—Results were explained by use of two factors for increasing percentage of starch. Factors are cumulative in effect, each in homozygous condition giving greater result than when heterozygous. Table shows theoretical genetic classes and actual results in close agreement.—"Yellow berry" in wheat shows opaque spots with definite margins rather than diffuse opaqueness.—Genetic factors have not been fully analyzed but are evidently distinct from those which give rise to true softness. Percentage of "yellow berry" in pure lines of hard wheat is inherited. This character, however, is very sensitive to environment.—CARL KURTZWEIL.

222. **Goodale, H. D.,** Inheritance of winter egg production. Science **47**: 542-543. May 31, 1918.—A Cornish male was mated simultaneously to (a) Rhode Island Red hens from high fecundity families (mean winter egg production 52.5) and (b) to Cornish females (mean winter egg production 8.47). Cross A gave 33 pullets with mean winter production of 49.2. Cross B gave 11 pullets with mean winter production of 11.6. Author concludes that high-producing hens are able to transmit high fecundity directly to daughters; and that the characteristic is not sex-linked in Rhode Island Reds. Result of Cross A is said to be opposed to results obtained by Pearl in matings between Cornish male and Barred Plymouth Rock females.—Author presents on basis of his results a theory of inheritance of egg-production alternative to Pearl's. He assumes that this character depends on two factors that follow usual Mendelian scheme. Difficulties in this interpretation as well as in that of Pearl are mentioned and briefly discussed.—P. B. HADLEY.

223. **Harland, S. C.,** On the genetics of crinkled dwarf rogues in Sea Island cotton. West Indian Bull. **16**: 353-355. 1918.—Continuation of previously published report on crossing of Sea Island cotton by a crinkled dwarf "rogue." Sixty-eight F_3 families were grown from F_2 plants of Sea Island type; 46 of these families were mixtures of Sea Island and rogues, giving total of 731 Sea Island plants and 240 rogues; 22 families, having total of 571 individuals, were uniformly Sea Island. Three families derived from rogues gave total of 98 plants,—all rogues. Genetic difference between Sea Island and rogue is therefore inherited in simple Mendelian fashion and this indicates how Sea Island may be purified of this type of rogues. A peculiar rogue reported upon in first paper, which assumed Sea Island charteristics in later stages, gave 39 Sea Island to 16 rogue offspring in F_2. Author considered it of ordinary heterozygous type.—J. P. KELLY.

224. **Hays, Frank A.,** The influence of excessive sexual activity of male rabbits. II. On the nature of their offspring. Jour. Exp. Zoöl. **25**: 571-613. Apr., 1918.—Offspring were obtained from 1st, 5th, 10th, 15th, and 20th services, in series of service taking place in rapid succession. Weight, head length, breadth between iliac extremes (measurements taken at 5-day intervals from birth to 90 days), and rate of mortality indicate that offspring from various service-types are not significantly different; hence author concluded excessive sex-activity has no effect on vigor of offspring. Sex ratio shows striking decrease of males from advanced services in series.—J. A. DETLEFSEN.

225. **Herrman, Charles,** Heredity and disease. Jour. Heredity 9: 77–80. Feb., 1918.—Author reports family of 6 children who die of pulmonary disease in early infancy; second family of 5 children, heart disease, same type. Physicians over-estimate virulence of infection, underestimate susceptibility of individual. Family histories should be made part of physicians' case histories. Author shows pedigree of amaurotic family idiocy, mongolian imbecility, and polydactylism. Inadequate family history study illustrated by example: Child showed sporadic cretinism; mother denied similar family affections; further questioning found father's two sisters operated on for goitre; patient's 16 year-old brother weighed 225 pounds; all indicating family disturbance of thyroid gland and endocrine system.—H. H. LAUGHLIN.

226. **Huntington, George S.,** Modern problems of evolution, variation, and inheritance in the anatomical part of the medical curriculum. Anat. Rec. 14: 359–445. June, 1918.

227. **Jennings, H. S.,** Disproof of a certain type of theories of crossing over between chromosomes. Amer. Nat. 52: 247–261. Apr.-May, 1918.—Mathematical investigation of type of hypothesis that supposes results of crossing over to be due to specific frequencies of exchange between individual members of pairs of genes, rather than to such relations between maternal and paternal groups of genes as are postulated on chiasmatype hypothesis. Formulae are deduced for calculating maximum and minimum frequencies of exchange mathematically possible with given percentages of crossing over. It is then shown that results possible on this view are hopelessly at variance with those actually observed in Drosophila. Jennings points out that this constitutes disproof of the simple specific frequency of exchange hypothesis, which must either be discarded, or be bolstered up with accessory hypotheses that will make it approximate to the chiasmatype hypothesis.—A. H. STURTEVANT.

228. **Jones, Donald F.,** Bearing of heterosis upon double fertilization. Bot. Gaz. 65: 324–333. Apr., 1918.—Reviews work of Collins and Kempton and presents further data to show immediate effect on size of seed in maize due to cross pollination. Heterozygous and selfed seeds on same ears compared. Types crossed by Jones previously selfed 3 to 6 generations. Reciprocal crosses made. All plants of each line descended from some individual in previous generation. The strains used had yellow or white endosperm. Heterozygous seeds in resulting ears were distributed at random and clearly distinguishable. Twenty-four ears with both selfed and crossed seeds obtained. Average increase in weight of crossed seeds was 5 to 35 per cent.—Opposes suggestion of Němec that endosperm hybridization is an adaptation resulting in alteration of food supply to accord with properties of hybrid embryo. Also opposes Coulter and Chamberlain who regard various fusions as stimulus to growth.—Hypothesis again advanced that heterosis is not due to an indefinite physiological stimulus but is result of bringing together of maximum number of growth factors showing partial dominance. Shriveled condition of wheat hybrid seed probably due to favorable aggregation of growth factors for first generation of hybrid plant but not to the hybrid endosperm. —CARL KURTZWEIL.

229. **King, Helen Dean,** Studies on inbreeding. I. The effects in inbreeding on the growth and variability in the body weight of the albino rat. Jour. Exp. Zoöl. 26: 1–54. May, 1918.—Inbreeding for fifteen generations resulted in no decrease in weight of body, inbred females being about equal in weight to controls, males heavier than controls. Decrease in weight during part of the series was due to malnutrition, since it occurred also in controls. Males were heavier than females. Variability of weight is greatest before age of two months in both sexes. Males and females were about equally variable before age of two months; after that age males were more variable than females. Both sexes of inbred rats were more variable than controls early in life, less variable later. Variability decreased in successive inbred generations, but not as rapidly as presumable approach to homozygosis.—A. F. SHULL.

230. **King, H. D.,** Studies on inbreeding. II. The effects of inbreeding on the fertility and on the constitutional vigor of the albino rat. Jour. Exp. Zoöl. 26: 335–378. *2 fig., pl. 5,* 1918.—Two series of albino rats carried through 25 generations brother and sister mating including altogether 25,452 individuals, total of 3,308 litters. Extreme litter sizes 1 and 17. First litter usually smallest, second litter largest, third and fourth smaller than second. Litter size depends chiefly on age, not on relatedness of parents. Entire inbred series averaged 7.5 young per litter,—stock 6.7. Sterility not increased by inbreeding. Partial sterility occurred in apparently healthy females found due to diseased condition of reproductive organs. Constitutional vigor apparently not impaired to any extent by inbreeding. Two kinds of malformations, taillessness and eyelessness, occurred rarely and appeared not to be heritable. Increased longevity shown by inbred compared to stock rats. Females longer lived than males and less susceptible to disease at all ages. Behavior tests showed inbred rats slower, less active, more timid and nervous and somewhat more savage than outbred animals. High fecundity, early sexual maturity and vigorous growth correlated. Superiority of inbred animals of one series to animals of other series in fertility, earliness of sexual maturity, and longevity considered due to segregation of genetic factors. Conclusion: result of inbreeding depends on character of stock inbred, selection and environment.—D. F. Jones.

231. **Lancefield, D. E.,** Three mutations in previously known loci. Amer. Nat. 52: 264–269. Apr.–May, 1918—Author reports recurrence of two well known sex-linked mutants of *Drosophila melanogaster*, namely, white eye-color and rudimentary wings, and also appearance of seventh mutant allelomorph of white, namely, "coral" (w^{co}), which is the darkest mutant member of this series, being as dark as dark "bloods" without showing light fluctuations of "blood."—C. B. Bridges.

232. **La Rue, Carl D., and H. H. Bartlett,** An analysis of the changes involved in a case of progressive mutation. Genetics 3: 207–224. *1 fig.* May, 1918—Authors present data as to length and width of leaves, length of capsules, number of ovules, length of spiral tracheids and of fiber tracheids of the capsules, and length of fiber tracheids of wood at base of stems, in *Oenothera Reynoldsii*, and its three mutational derivatives, *semialta*, *debilis* and *bilonga*. They conclude that increase and reduction in size of entire plant and of organs in this series of mutations involve only number and arrangement of cells, not at all size of cells. Increase in number of cells is taken as criterion of progressive mutation, decrease as representing retrogressive mutation. Mut. *bilonga* is characterized by remarkably long capsules (42–73 mm.). Number of ovules (933–1347 in *bilonga*) is approximately proportional to length of capsule, *Oe. Reynoldsii* having 647–857 ovules in capsules 30–45 mm. long. Percentage of sterility is about same in both forms. In Mut. *semialta* and mut. *debilis* capsules are shorter than in parent species, number of ovules about same, but percentage sterility considerably increased (from 36 percent in *Reynoldsii* to 75 percent in *semialta* and 85 percent in *debilis*). Authors correlate degree of sterility inversely with degree of vegetative vigor (nutrition).—Wood elements from stems of mutation crosses among above-mentioned types showed no differences from those of parental types; this was to be expected as all parents were alike in this regard. One plant of cross mut. *debilis* × mut. *semialta* gave a bimodal curve of length of wood tracheids. It is suggested that possibly this plant was a chimera.

233. **Lillie, Ralph S.,** Heredity from the physico-chemical point of view. Biol. Bull. 34: 65–90. Feb., 1918—Attempts to analyze into simplest physico-chemical terms the power of specific construction—of structural and chemical synthesis—which is common to all forms of living matter.—The problem of heredity is not to be dealt with by itself, but is identical with most fundamental problem of general physiology, how living protoplasm is synthesized from non-living matter.—Process of specific creative synthesis which lies at bottom of heredity inherent in life process in all of its forms.—Most fundamental property of living matter is power of proliferation at expense of materials and energy taken in from outside. Biologists must, therefore, seek for some general structural or physico-chemical peculiarity of living organisms which enables their substance to build up substance of generally similar kind.—Broadly considered, distinction between growth and reproduction is ill-defined. Physio-

logically both are in many essential features same. Proliferation which leads to growth and proliferation which leads to reproduction with the associated phenomena called inheritance, are, therefore, only artificially distinguishable in organisms as a whole.

Author presents thoughtful discussion of various physico-chemical problems which must be solved to fulfill above ends. Among subjects considered are specific character of proteins of different species. Physiologically corresponding or homologous proteins are more nearly alike the more nearly related the species from which they are isolated. Thus there is a general parallelism between degree of chemical relationship exhibited by homologous proteins and degree of biological relationship of the species from which they are derived. The marked physiological difference in a large number of pairs of stereo-isomers is taken as clear proof that activity of living protoplasm is largely conditioned upon specific space relations of atoms composing the physiologically active molecules. This is particularly true of compounds entering into metabolism. It is suggested that specific constructive metabolism is determined by stereo-structure. Specific non-living organizations found in electro-syntheses are discussed, and it is suggested that in certain regards structure-forming processes in living and non-living systems, otherwise not altogether similar, show significant parallelisms.—In higher organisms special mechanisms of heredity coördination and control have been superimposed upon elementary physico-chemical mechanism which conditions the fundamental proliferative activity. For example, chromosomes may control the detailed character of developmental proliferation.—J. A. Harris.

234. **Nuttall, J. S. W.**, A note on the inheritance of colour in one breed of pigeons—An attempt to demonstrate a Mendeliam type of transmission. Jour. Genetics 7: 119–124. Feb., 1918.—Report of unfinished experiments on "Racing Pigeons." Finds (1) red (R) of red chequer or mealy dominant to blue (r), (2) presence of chequering (C) dominant to its absence (c). No mention of previous authors.—L. J. Cole.

235. **Orton, W. A.**, Breeding for disease resistance in plants. Amer. Jour. Bot. 5: 279–283. June, 1918. Brief review of what has been accomplished by breeding for disease resistance. Importance of intercontinental relation in problems of plant diseases pointed out. Nature has been breeding disease resistant plants since the world began. Work of breeder is largely to isolate these forms in plants economically desirable. Elimination of old non-resistant stock important.—History of control by breeding of asparagus rust, cotton wilt, cowpea wilt and root-knot. Favorable results obtained with watermelon wilt, cabbage yellows, tomato wilt, flax wilt and root-rot of tobacco also briefly outlined.—R. J. Garber.

236. **Payne, Fernandus**, An experiment to test the nature of the variations on which selection acts. Indiana University Studies 5 (No. 36): 3–45. Mar., 1918.—Selection increased number of bristles on scutellum of *Drosophila ampelophila*. Increase was not gradual, but indicated series of mutations. Return selection was not effective. Two factors for extra bristles were located, one near zero end of X-chromosome, other in third chromosome. Evidence supports multiple factor interpretation.—E. Roberts.

237. **Putnam, Eben**, Tracing your ancestors. Jour. Heredity, 9: 8–14. Jan., 1918.—Author urges study of ancestors and gives valuable suggestions as to sources of information and methods of recording. Genealogy should be more than collection of names and dates, and should not be limited to male line, as traits do not follow accident of name.—H. H. Laughlin.

238. **Redfield, C. L.**, Some eminent men. N. Amer. Jour. Homeopathy, p. 1–7. June, 1918.—Author cites eminent men to prove relationship between quality of child and age of parent at its birth. Franklin was born when his father was 51; H. W. Beecher, Washington, Lord Kelvin, James Watt, when their fathers were 38; Audubon, when his father was 57; John and Charles Wesley, when their father was 40 and 43 years of age, respectively; Confucius, when his father was 71, Humboldt, when his father was 49. Author emphasizes that such fathers got education first and children afterward; deems anti-Lamarckian opinions unworthy of consideration.—J. P. Kelly.

239. **Riddle, Oscar,** Further observations on the relative size and form of the right and left testes of pigeons in health and disease and as influenced by heredity. Anat. Record 14: 283–334. May, 1918.—In healthy adult doves and pigeons right testis is usually larger, but shorter and thicker, than left. In hybrids these relations are reversed in an increased proportion of cases, reversal being more frequent in generic than in specific hybrids. Reversal makes a male bird more like female, in which left is always larger (or only) gonad. Other work had shown that hybridizing increased the number of males. Author suggests that reversed males are those forced, by crossing, to develop from female-producing eggs.—A. F. SHULL.

240. **Riddle, Oscar,** A demonstration of the origin of two pairs of female identical twins from ova of high storage metabolism. Jour. Exp. Zool. 26: 227–254. July 5, 1918.—Author reports two instances in ring dove in which identical female twins arose from a single ovum, and states that each ovum was characterized by "high storage metabolism" ["low (oxidizing) metabolism"]. These eggs were clearly shown not to be double-yolked eggs, and were considerably (24.9 and 43.1 per cent., respectively) larger than the other members of the pair. Both twin-producing yolks were second of the clutch. In addition it is stated that both cases occurred (1) in reproductively over-worked females, (2) in periods of continuous activity, (3) in very short intervals—since the previous clutch, and (4) that such crowded reproduction tends to produce an excess of females.—Author wonders if formation of identical twins was due to causal nexus between extraordinary size of yolks and unusual separation of blastomeres.—Author sketches view according to which size of yolk might influence disposition of segmentation spheres at animal pole, according to which identical twins should arise from extremely large and extremely small eggs of a species, females arising from former and males from latter, according to author's earlier view. Cases reported support this view, although one must await finding of identical males arising from extremely small eggs.—P. B. HADLEY.

241. **Schultz, Adolf H.,** Studies in the sex-ratio in man. Biol. Bull. 34: 257–275. April, 1918.—Tertiary or adult sex-ratio for each continent shows slight excess of males, except in Europe. In Europe, female excess grows with advancing age. Greater male mortality and emigration are two potent causes. Secondary or birth sex-ratio shows slight but consistent excess of males. Primary sex-ratio (at time of fertilization) cannot be determined directly, but statistics on still-births and abortions indicate about 10 percent excess of males in primary sex-ratio for there is an excess of males in both cases. Review of literature on supposed causes of deviation from equality of two sexes in primary and secondary sex-ratio appended.—J. A. DETLEFSEN.

242. **Sinha, S.,** Polydactylism and tooth color. Jour. Heredity, 9: 96. Feb., 1918.—Writer cites recurrence of extra thumb in two successive generations, in first generation only once among 11 sibs, in second generation once among 5 sibs. Shows lack of usual typical dominance of this character. In another family recurrence of brown (vs. white) teeth recorded in three successive generations in matings with normal white.—H. H. LAUGHLIN.

243. **Stout, A. B.,** Fertility in *Cichorium intybus*: Self-compatibility and self-incompatibility among the offspring of self-fertile lines of descent. Jour. Genetics 7: 71–103. Feb., 1918.—Study of seed production in progenies of self-fertile plants of chicory, especially third generation descendants of three self-sterile parents. Over 500 offspring of two original crosses between unimproved cultivated chicory and one wild white-flowered plant tested as to self-fertility. Sterility due to physiological incompatibilities, not to anatomical incompatibilities. Tables giving percentage fertilities of different series show them to be exceedingly fluctuating. Self-sterile plants occur in all series. No very decided family differences apparent. Offspring of parents with self-fertility above 30 percent show somewhat higher percentage of self-fertility than offspring of parents of lower percentage self-fertility (Table VIII). Differences in vegetative vigor and total flower production not correlated with self-fertility.—Author concluded self-incompatibility and self-compatibility in chicory are

not to be described as dominant and recessive characters, or paired allelomorphs, and that there is no simple Mendelian formula that fits results. Factors effecting or prohibiting fertilization are "highly variable as to degree, specificity and transmission in heredity."—HELENE M. BOAS.

244. **Sturtevant, A. H.,** Science 47: 641–621. June 28, 1918. Review of Babcock and Clausen's "Genetics in relation to agriculture."

245. **Sumner, F. B.,** Continuous and discontinuous variations and their inheritance in Peromyscus. II. Amer. Nat. 52: 290–300. June-July, 1918.—Geographical races of Peromys, cus reared in confinement exhibited in general differences (color, length of ear, tail, and foot, width of tail-stripes) which distinguished them in nature, showing that differences were not caused by environment. Differences in tail length and tail-stripe, among animals of same race, are shown to be inherited (coefficients of heredity about + 0.30). Crosses between certain of these races yielded F_1 and F_2 both intermediate, on the average, with F_2 only slightly or not at all more variable than F_1.—A. F. SHULL.

246. **Thomson, J. Arthur,** Scientia 23: 391–393. 1918. French review of J. P. Lotsy's "Evolution by means of hybridization."

247. **Weinstein, Alexander,** Coincidence of crossing over in *Drosophila melanogaster* (*ampelophila*). Genetics 3: 135–172. March, 1918.—In Drosophila crossing over in one region of a chromosome prevents second crossover within considerable distance along chromosome from first crossover. This "interference" progressively decreases as distance from point of initial crossing over increases. Weinstein's work on X chromosome shows that when crossover has occurred in region between eosin and ruby a coincident crossover in region as far from first as that between sable and forked is as likely to occur as though the doubles were distributed according to chance alone. (Coincidence = 1.025). With a greater interval a slight interference *reappears* (Coincidence 0.8572). With a still greater interval this interference rises still higher (Coincidence 0.7221). Some data presented in case of second chromosome indicate that similar relation obtains there also.—Statistical significance of these data is difficult to determine accurately. If this secondary drop in coincidence is real, then important basis for closer definition of mechanism of crossing over has been established. All known facts of coincidence, including this secondary fall, are in accord with view that chromosomes are loosely twisted and that there is definite tendency to form internodes of *particular* length. In case crossing over is due primarily to tension of tightly twisted strands, then an additional condition must be sought to explain this secondary drop.—Triple crossing over with formula for calculating coincidence of such cases, and maximum and minimum values for coincidence are discussed. Three new sex-linked mutations and one already known appeared.—CALVIN B. BRIDGES.

248. **White, Orland E.,** Environment, variation and the laws of heredity. Brooklyn Bot. Gard. Leaflets 6 (No. 2): 1–16. *9 fig.* Apr. 17, 1918.—Except for few verbal changes this semi-popular discussion duplicates previous "Leaflet" by author on same subject (Brooklyn Bot. Gard. Leaflets 4 (No. 2): 1–12. June 28, 1916).—R. J. GARBER.

249. **White, O. E.,** Breeding new castor beans. Jour. Heredity 9: 195–200. *3 fig.* May–June, 1918.—Author briefly mentions botanical relationship of castor bean (*Ricinus communis*); its hundreds of distinct varieties, with variation in size, oil content, and yield; where grown, and future possibilities in United States, owing to war and aeroplane uses. To make castor oil bean growing permanent industry, new varieties must be obtained by breeding, which will possess highest possible oil content, smallest amount of objectionable "acid," adaptability to waste and sandy lands, close, compact fruiting spikes with thin-walled, spineless, "non-popping" seed capsules, productiveness, earliness and long bearing season. These characters exist among innumerable forms and simply need to be brought together into one or more commercial varieties.—Little breeding work has been done with castor beans. They

are excellent material to work with, easily grown, comparatively free from diseases, produce seeds viable for many years and of high germination, and fertile F_1 and F_2 hybrids, even in most extreme crosses. Among characters showing Mendelian behavior are stem, foliage, and seed coat color, glaucous or non-glaucous plants, "popping" (dehiscent), or "non-popping" seed capsules, types of seed coat mottling, seed size and shape, height of plant, compactness and size of fruiting spike, time of maturity, certain leaf characters, etc. Few of these characters have been sufficiently studied to be placed on factorial basis.—Technique of crossing and selfing is given. Cross-fertilization probably does not exceed 5 percent. This small amount of crossing was accounted for by abundance of pollen, comparative proximity of female to male flowers, and sheltering effect of foilage against air currents carrying foreign pollen. As flowers of castor beans are said to be excellent honey producers author thinks greater cross-fertilization might be expected where bees are common.—RICHARD WELLINGTON.

250. **White, Orland E.,** Inheritance studies in Pisum. III. The inheritance of height in peas. Mem. Torrey Bot. Club, **17:** 316–322. June 10, 1918.—Author studied height of over two hundred varieties and found problem more complex than heretofore considered. Divides tall (over 4.5 feet) varieties into three distinct groups. Crosses between these types and tall give, F_1 and F_2, all talls, but of different types. Large numbers of internodes usually dominant over smaller number. Believes each tall type represents distinct mutation. Half-dwarfs separated into two generic types (1) long internodes, few in number, (2) short internodes, more numerous. These give F_2 approximately 9:3:3:1.—True dwarfs (6 inches to 3.5 feet) possess 8 to 20 short internodes. Crosses with various types of talls, F_1 always consists of talls with long internodes, although many internodes may not in all cases dominate over few. F_2 generation of tall $\times$ dwarf consists of 4 classes; talls with long internodes, half-dwarfs with either long or short internodes, and true dwarfs, and approximates 9:3:3:1 ratio. This is probably cross made by Mendel.—Author believes previous ideas of inheritance of height in peas have been based upon difference of internode length alone, all short-internode varieties being classified as dwarfs and all long internodes as talls. These in F_2 give 3:1.

Crosses between half-dwarfs with long internodes, and true dwarfs, gave half-dwarfs in F_1 and approximately 3 half-dwarfs (long internodes) and 1 dwarf (short internodes) in F_2. —Author explains above data by presence and absence of five generic factors for height, two of which determine internode length and three the difference in number of internodes.—C. E. MYERS.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor.*

[Unsigned abstracts are by the editor.]

251. **Leopold, Aldo,** Foresty and game conservation. Jour. Forestry 16:404–411. Apr., 1918.—It is pointed out that foresters so far have materially failed to recognize game production as part of their work in connection with handling the forest according to the best practice. This has been due to the dual authority over the game, the lack of a game administration demand, and a possible fear of the interference of game with silviculture. That the work should be handled by foresters is only a natural outcome of the situation as they know conditions, game, and are on the ground with a training which fits them for the work. —Game conservation is compared with silviculture when the various practices of raising, cutting and marketing game are shown to be analagous to silvicultural practices of handling timber lands. So far no forestry method has been applied to the game and destruction of the stand as in the original forests has been the rule. A plea is made for a rational policy in handling the game situation which would add a great deal to the recreational value of the forests.—E. N. MUNNS.

252. **Baker, F. S.,** Aspen reproduction and management. Jour. Forest. 16: 389-398. Apr., 1918.—Studies of the aspen (*Populus tremuloides*) in the great Basin region have been made to determine the characteristics of seed and vegetative reproduction. Cuttings were made in the spring, in summer and in fall, during these seasons and in even aged stands of 70, 90 and 110 years.—So far, no aspen seedlings have been found in the region, connection to some underground stem of a previous stand always having been found. In five years observations, only in 1917 were any pistillate flowers found and practically all were sterile. Staminate flowers appear every season, but the bulk of the pollen—65 percent of 36 catkins—is infertile. The time of seed production is also associated with dry weather so that germination would be unlikely.—The vegetative production is of great vigor and persistence, and of 5417 sprouts on a clear cut area, 83 percent were root suckers, 9 percent were from old sprout groups, 7 percent were from the root collar, and 1 percent from the stump. Cuttings made in the fall sprout the next spring, those made in the summer do likewise, and those made in the spring may sprout the same year, but the maximum occur in the following season. Spring cutting results in the greatest number of sprouts per unit area, fall cutting the least, while the height growth has been but little affected by the season, the diversity of the stand being of greater importance. Age of the parent stands have little effect on the vigor or size of the sprouts. But if sprouts are taken off before there is sufficient plant food stored up in the roots for the next set of sprouts, the stand is soon exhausted, and may in the successive years destroy the stand entirely. In virgin stands, sprouts occur occasionally in openings and it is found that the heavier this shade the greater the number of sprouts, but also the fewer number that survive.

It was found that sheep damage to the sprout reproduction was proportional to the closeness of the grazing, and three successive years grazing destroyed the stand. Cattle seldom damaged the reproduction except when the area was overgrazed. Bark eating mammals working under a snow cover damage the sprouts considerably at times.—Aspen handled under a clear-cutting system with a coppice regeneration is simple and rotations of under 90 years are indicated. Sheep should be excluded for three years after cutting to insure successful reproduction though moderate cattle grazing may be permitted. A system of brush disposal to prevent sheep doing much damage to the sprout may be possible.—E. N. Munns.

253. **Bates, C. G.,** Concerning site. Jour. Forestry 16: 383-388. Apr., 1918.—"The only final criterion of site quality is the current annual cubic foot increment of a fully stocked stand of the species under consideration." The "only final criterion" is defined later as the "only satisfactory" one since quality production also should be taken into consideration. This he believes will be obtained under forest management. There is still the question of density and strength of the material in relation to site but complete knowledge is not likely to cause deviation from quantity standard. By "current annual increment" the author understands the growth for a ten-year period which is relatively close to the normal.—The author proposes changing the present system of designation from the Roman to the Arabic, making subdivisions of 30 cubic feet and expressing the site in groups as; 1a, or 1b representing a growth of from 10 to 20 cubic feet per acre, and from 20 to 30; etc.—Height is said to be controlled solely by soil moisture and there is a definite gradient in sap density from the roots to the tree top to maintain the osmotic water transfer at a definite rate. Height growth ceases when the minimum gradient commensurate with the demands of the tree and the maximum density which can be tolerated by the protoplasm of the topmost cells have been reached.—Height relations are taken to be purely moisture relations with height as an index of the density of the soil solution, height alone not summing up all the factors which the forester expresses in "site quality."—Edw. N. Munns.

254. **Bhola, Mathura P.,** Germination of Cupressus torulosa seed. Indian Forester 44: 175-176. Apr., 1918.—Reports experiments conducted at Pauri during the monsoon rains of 1917. Seeds were sown in pots early in July after being treated in various ways, the pots kept in the open. Seed sown in the nursery gave similar results to the potted seed. Seed

sown in August of the preceding year did not germinate until October. Lowest percentage of germination was obtained when seed was immersed in boiling water for three minutes, while best was obtained without any special treatment. Mixing the seed with manure caused germination in two days less time than when planted without treatment or with simple soaking for 24 hours. The best practice appears to be sowing without previous treatment and just after the break of the monsoon rains, in order to take advantage of the wet weather. —E. N. Munns.

255. **Campbell, W. B.,** The fuel value of wood. Canad. Forest. Jour. **14**: 1632–1633. Apr., 1918.—"An authoritative guide for the wood user, giving accurate data on fuel values." The author goes into the mechanics of fuel combustion and explains the need of air-dry wood, and why woods differ in their heat values. Equal weights of wood, though of different kinds have the same calorific value. A pound of coal has from 12,000 to 13,000 British thermal units, while a pounds of perfectly dry wood has 8,220 British thermal units. The weight of a cord of wood multiplied by 8220; minus the weight of the water contained in the cord, multiplied by 720 gives the heating value of the cord of wood which may be compared with the heating value of the ton of coal worked out in the same way. A table shows the number of cords of wood required to equal a ton of coal, for 17 species. It is pointed out that as the coal contains a large amount of ash, it may reduce the calorific value of a pound of coal to 10,000 British thermal units and so increase the relative value of the wood.—E. N. Munns.

256. **Marsden, E.,** Method of working bamboos. Indian Forester **44**: 147–166. Apr., 1918.—Reports managements studies with *Dendrocalamus strictus* carried on in plots laid out in 1910. Different treatments were tried out, as to frequency of cutting, proportion of new shoots removed, and height of cutting. Cutting annually, whether taking all or part of the stand, or the manner of cutting, show decreased vigor and size in the culms, which averaged 17.7 feet in length and 2.4 inches in diameter. With a rotation of two years, the lengths averaged from 20 to 24 feet, the diameters from 2.5 to 3 inches, the height of cutting having no effect. Where the cutting removed all the culms except new shoots, both lengths and diameters were less than when only half the culms were removed. With the 3-year rotation, the clumps gave much better results, producing more, larger, and longer culms per clump, with a marked increase in the sise and number. With a 4-year rotation, the length and diameters average smaller and the number of culms per clump is unchanged.

Other features brought out are: that heavy rains may or may not increase height and diameter growth, that cutting below the ground level has nothing to commend it, and that a rotation of more than 4 years would result in drying up the culm entirely. The topmost internode usually becomes dry in one year, while the rest of the culm stays green for 1 to 3 years. Cutting all the culms from one part of a clump has a tendency to kill that part of the clump, and the removal of all culms except the new ones causes the new shoot to become bent because of lack of support. Cutting should be deferred till as late in the season as practicable, to avoid bending the tender new shoots. Lignification takes place after the shoots are 9 to 10 months old, and when they are 18 months old they are difficult to distinguish from those 30 months old.—Author concludes that some culms must be left standing and that a 2-year rotation leaving half the old culms may be much better than a 3-year rotation taking all the old culms. A system may be based on the sise of the clump and the number of new shoots produced, but there is much variation. A modification of the minimum diameter limit may be found to give the best basis for a system.—E. N. Munns.

257. **Munns, E. N.,** Relative frost resistance of Eucalyptus in Southern California. Jour. Forest. **16**: 412–428. 1918.—An unusually cold season was experienced in Southern California in January, 1913, when temperature dropped to 15° in the San Bernardino Valley. The effect of the low temperature on 26 species of *Eucalyptus* was studied on trees of different ages and origin. A description is given of the effect of this freeze, the damage done and the manner of recovery for each species studied and a table lists the species in groups as to their frost-hardiness. Nursery stock is exceedingly liable to damage, but smudging in the lath house prevents much damage.—E. N. Munns.

258. **Osmaston, B. B.,** Rate of growth of bamboos. Indian Forester **44:** 52–58. Feb., 1918.—For 4 months measurements were made on culms of the giant bamboo at Dehra Dun, India, twice a day, or at shorter intervals when the effect of temperature, rainfall, or sunshine was under consideration. It appears that the culms develop towards the end of the rainy season, completing the height growth about 8 weeks after the end of this period. Night growth usually was double that of the day and the author thinks that this has no special relation to the daily periodicity of light and temperature, as the greatest growth occurred during periods of highest humidity. With sunshine comes higher temperature which, unless it is raining, reacts on growth adversely, as the evaporation from the culm reduces turgescence. Under suitable humidity conditions (i.e., during a long continued drizzle) the rate of growth during the day was the same as that during the night, for a 4-hour period. The maximum growth during 24 hours was 13 inches. Tables of growth and charts of temperatures and rainfall at Dehra Dun, for the period under discussion are included.—E. N. Munns.

259. **Puran, Singh,** A preliminary work on the management of wood-tar. Indian Forester **44:** 141–147. Apr., 1918. Analyses show tar made in India from *Pinus longifolia* has the same general characteristics as imported wood tar as to color, odor, consistency and solubility, but differs slightly in specific gravity and the percentage of light oil and pitch. The percentage of heavy oil is practically the same as the imported tar. From the work so far carried on the author believes that local industry can be developed to furnish the Indian market with a satisfactory wood tar. The kiln method will not be possible owing to the small percentage of tar in the wood, and a form of a portable retort must be devised. The charcoal remaining has very little market value.—E. N. Munns.

260. **Record, Samuel J.,** Intercellular canals in dicotyledonous wood. Jour. Forest. **16:** 429–442. Apr., 1918.—In general, dicotyledonous woods with secretory canals confined to tropical or subtropical regions. Such canals occur normally in some large stems while in others arise pathologically from an injury. In some dicotyledonous woods these are either all axial or all radial unlike the conifers which have them in both planes where resin ducts occur normally. Traumatic vertical ducts often originate in these conifers (*Pinus, Picea, Larix, Pseudotseya*) and in *Seqrioia, Abies, Tsuga* and *Cedrus*. In dicotyledonous woods, traumatic radial canals may arise independently of the vertical ones, or both vertical and horizontal ducts may arise as a result of injury. The normal arrangement is in tangential series giving the effect of growth rings.—The cells surrounding these ducts are chiefly parenchymatous, with the limiting cells either thick or thin walled. The origin and development are not uniform being schizogenous, lysigneous or schezo-lysigneous depending on the species. The presence of radial ducts is a great help in identifying tropical woods varying in size and number according to the species. The width of the rays vary widely. When very narrow the presence of the duct causes an enlargement while in the wider rays the ducts have no effect. A single ray may contain as high as four ducts. In section the radical canal is circular or elliptical, the limiting cells being thick walled usually. Radial canals are usually associated with vertical ducts in the cortex and, may end blindly in the ray without reaching the pith—extend to the pith and unite with vertical ducts, or connect with vertical ducts in the wood.—Some woods contain secretory cavities instead of canals, the space being spherical in shape and non-muscilaginous, though some muscilaginous cavities have been found.—A synopsis of the various families of the dicotyledons in which intercellular canals in wood have been observed lists Hamamelidaceae, Rosaceae, Leguminoseae, Rutaceae, Simarubaceae, Burseraceae, Meliaceae, Anacardiaceae, Bombaceae, Dipterocarpaceae, Combretaceae, Myrtaceae, Araliaceae, Styraceae, Boraginaceae, Compositae. Comments are made on the canals found in these families. A figure helps explain the text.—E. N. Munns.

261. **Harper, Roland M.,** Changes in the forest area of New England in three centuries. Jour. Forestry **16:** 442–453. Apr., 1918.—Originally the forested area of the New England States was at least 90 percent of the total, but with the increase in population the forests

were destroyed to furnish arable land. Agriculture appears to have reached a maximum about 1875 for the census figures show a decrease in the land being farmed, with a corresponding increase in wooded area. The development of transportation caused a heavy migration from this region to the much more fertile agricultural lands in the Ohio Valley, while manufacturing increased due to the abundance of cheap water power. Data derived from the census figures show the area of forests to have steadily decreased up to about 1850 and that since that time the area in woodland has been increasing; Maine with some 75 percent of her area in forest; New Hampshire, an increase in wooded area from 50 percent to 65 percent; and the other states from 30 to 40 percent, to over 40 percent. Data are shown graphically in a diagram.

The earliest use of wood was for domestic use, in the construction of the dwellings and general farm use, but later log-driving was developed and most material was exported. Later the use of wood for fuel developed to great proportions following the advent of the locomotive which was originally a wood-burner. Pulpwood products began to be important as coal was developed for transportation, being confined chiefly to the spruce forest region. The development of transportation was perhaps the biggest factor in the increase in forest area for lumber from other regions could compete easily with the domestic product, while coal could be brought in and burned in the cities much more economically than wood. How much further the forest area will increase is largely a matter of conjecture.—Edw. N. Munns.

262. **Turner, H. C.,** Effect of planting method upon growth of western yellow pine. Jour. Forestry 16: 399–403. Apr., 1918.—Experiments on planting methods have been carried on at the Fort Bayard Nursery in the Southwest for several years, since 1912, plantations of western yellow pine being established by the "mound" and by the "side-hole" methods. In this work it was found that the "mound" method gave the highest percent of survival, and examinations show the average height growth of the 1912 plantings totaled 30.9 inches for the "mound" method against 26.2 inches for the "side-hole" planted trees. The average height growth in 1915 was 8.4 inches for the "mound" planted and 7.2 inches for the "side-hole," while in 1916 the respective growths were 9.5 and 8.3 inches. Plantations established in 1913 show the "mound" stock to be 16.35 inches while side-hole averaged 13.78 inches.

According to the author, the difference in the height growth is due to the manner of planting, distortion of the roots acting adversely upon height development. The "mound" method is acknowledged too expensive for general field planting, but a plea is made for more careful attention to the placing of the roots in reforestation. The separation and spreading of the roots as widely as possible is urged.—E. N. Munns.

263. **Turner, Harry C.,** The effect of planting methods upon growth of western yellow pine. Jour. of Forestry 16: 399–404. 1918.—Experiments in planting the western yellow pine (*Pinus ponderosa*) in Arizona and New Mexico have been carried on for a number of years. Three methods have been tried; the "Side-hole," the "Middle-of-hole" and the "mound" method. After 3 years, it was found that with care in planting, all three measures gave equally good percentages of survival, though a slight difference was noted in favor of the "mound" method. The 4-year old plantations examined in 1915, when the trees had been planted by the "side-hole" and "mound" methods revealed that the average height of the former was 26.2 inches, and that of the latter was 30.9 inches, the growth in height for 1915 being 7.2 and 8.4 inches, respectively. The other area showed the average of 100 trees planted by the "mound" method to be 16.35 inches, while the average height of the trees planted by the "side-hole" method was 13.78 inches, a difference of 2.57 inches of four years, or 18.65 percent.—Examination of the roots planted by the "mound" method showed an equal development in all directions, while those planted "side-hole," showed a marked tendency to grow one-sided and away from the side of the hole against which they were placed. This root growth has always been a matter of attention in the nursery transplant beds, but up to the present appears not to have received sufficient attention.—E. N. Munns.

HORTICULTURE

W. H. Chandler, *Editor.*

[Unsigned abstracts are by the editor.]

264. **Blake, M. A.,** Observations upon summer pruning of the apple and peach. Proc. Amer. Soc. Hort. Sci. **14:** 14–23. (1917) 1918.—A preliminary report on some experiments with summer pruning started at the New Jersey Experiment Station in 1912. A rather complete review of the literature on summer pruning is given. The author's results indicate that summer pruning of the trees during the first summer after planting tends to reduce the total growth. From observations by practical growers, however, the author is of the opinion that early summer rubbing off of opening buds where branches are not desired may be desirable. While it tends to reduce the growth the first summer it makes unnecessary much pruning that would reduce the growth during the second summer. With older trees the effect of summer pinching back of the shoots was in nearly all cases to permit the pushing of buds that might ordinarily remain dormant. Sometimes when the pinching was done just before a dry period the buds did not push at once, but pushed as soon as there was favorable weather.—The author emphasizes the fact that it is the summer cutting or pinching back of new shoots and not thinning out the shoots that would be expected to influence the maturity of the wood. In his experience generally the effect of this pinching or cutting back was to delay maturity of the wood and fruit also by causing the late growth.

265. **Heinicke, Arthur J.,** Factors influencing the abscission of flowers and partially developed fruits of the apple (Pyrus Malus L.) New York (Cornell) Agric. Exp. Sta. Bull. **393:** 45–114, *figs. 8.* July, 1917.—Results of observations and experiments made during the three seasons 1914–1916, with a view of determining the factors influencing abscission of flowers and partially developed fruits of the apple during so-called "June drop." The literature of the subject is briefly surveyed and a bibliography is appended.—Studies concerning the magnitude of abscission, indicate that from two-fifths to four-fifths of the total number of flowers are lost during the early drop, or within 1 to 4 weeks after the petals fall, and that only 3 to 7 percent remain after the June drop. From one-sixth to one-third of the total number of flower bearing spurs finally retain fruits, the proportion varying with the variety, with trees of the same variety, and with different limbs of the same tree. The variations in the latter case were not due to the location of the limb, nor to the angle at which it grew, but it was found that a larger percentage of spurs set fruit on limbs that had produced a relatively light bloom than on those that had produced a full bloom, and that spurs on limbs with large leaves were more fruitful than those on limbs with small leaves.—During 1915, there was no consistent difference in fruitfulness between the spurs arising from 1913 wood and those arising from older wood, but as a rule, spurs arising from lateral buds on 1914 wood set comparatively few fruits in 1915. The spurs occuring near the end of the seasons' growth, or just before the zone of weak buds seemed to be most likely to set fruit.—The vigor of the individual spur was found to be an important factor in abscission, the strong spurs being more apt to retain fruits. As compared to weak spurs, the previous seasons' growth of vigorous spurs is longer, the new spur growth of cluster base is heavier, the bud leaves are more numerous, there are more flowers to the spur and the weight of the lateral growth is greater, all of which points to an abundance of reserve food in adjacent tissues. Furthermore, the diameter of the conducting cylinder on strong spurs is greater, and the leaves are larger than on weak spurs. It has been shown experimentally, that more water passes to strong buds than to weak buds, and that the size of the leaves is influenced by the amount of water available at the time of their expansion. It is believed, therefore, that the flowers and young fruits on weak spurs are handicapped not only by a small amount of reserve food but also by a limited amount of sap.—Experiments in which vigorous cluster bases were totally or partially defoliated show that the bud leaves are necessary as "sap pullers," and that a few leaves are just as good for this purpose as many leaves, so far as the set of fruit is concerned. Flower bearing spurs inclosed in translucent paper bags held more fruit than

those in opaque sacks.—The apples that fall in the early stages of their development have fewer seeds on the average than apples that remain on the tree, but some of the former lot have a relatively high seed content, and many of the latter lot have fewer seeds than the average. Spurs bearing fruit with a low seed value are heavier as a rule than spurs produced on the same limb but bearing fruits with a high seed value. This is shown to be due to the fact that on vigorous spurs, both poorly fertilized and well fertilized flowers develop into fruits; weak spurs, on the other hand retain only those fruits that have a high seed value, which usually means many good seeds.—The term "seed value" is based on a study of the interrelation of weight of fruit, number of seeds and vigor of the spur, and it emphasizes the importance of quality rather than number of seeds. This quality, which is manifested by the ability of the individual seeds to increase the weight of the fruit is associated with the size of the embryo, and it is thought to be the result of cross fertilization. Experiments are recorded which indicate that the seeds affect the osmotic properties of the apple, and in this way influence the movement of sap to and from the fruit. As a result of this influence they are often able to overcome the handicaps of poor conducting tissues and inadequate supply of reserve food, so that apples with many good seeds can develop even on weak spurs.—Experiments have shown that the absciss layer which brings about the loss of the apple is not formed so long as the sap passes into the fruit as it does under normal conditions, or away from it as is the case when the leaves draw sap from the apple; but abscission occurs when the movement of sap through the separation layer is inhibited while the spur is still living, e.g., when the fruit is removed from its stem, or when the transpiration is checked by coating the apple with vaseline, or by exposing the fruit and the spur to humid conditions. —The author concludes "that unfavorable conditions of nutrition and water supply are among the basic factors which cause the normal drop of flowers and partially developed fruits of the apple. All factors that have a direct or an indirect influence on nutrition and water supply of the individual flower and fruit, such as pollination, weather, cultivation, and the like, are of importance. Fruit development, however, is possible without cross-pollination and even under relatively unfavorable weather conditions, so long as the young fruit has an abundant supply of water and of readily available food."—A. J. H.

266. **Oskamp, Joseph,** The rôle of soil temperature in tree growth. Proc. Amer. Soc. Hort. Sci. **14**: 118–126. (1917) 1918.—Report of some studies in soil temperature as influenced by cultural methods in an orchard and the possible bearing which the soil temperature may have on the results of the different cultural methods. The author gives a considerable account of his experience in securing soil temperature records. All thermometers requiring personal reading were found useless and misleading for the purpose in hand, and soil thermographs were therefore adopted.—Temperature records were kept in plots receiving clean cultivation during most of the summer with a rye cover crop; the depth of spring plowing being about 7 inches; plots in grass, the grass being cut and allowed to lie where it fell, when a mulch of a bale of wheat straw to the tree was added; plots with grass which was cut and allowed to lie where it fell; and plots with grass which was cut and raked up around the tree.—The cultural methods did not greatly influence soil temperatures at a depth of 9 inches. The greatest variation in temperature was between the plot with cultivation and the one with grass and wheat straw. These were the two plots, however, that gave the best growth. The author concludes, therefore, that soil temperature is not an important factor in determining the growth of the trees. The heavy mulch maintained the soil temperature a few degrees higher in winter and considerably lower in summer. During the summer months the highest temperature occurred about 10.00 p.m. and the lowest about 12 hours later.

267. **Roberts, R. H.,** Winter injury to cherry blossom buds. Proc. Amer. Sci. Hort. Sci. **14**: 105–110. (1917) 1918.—A preliminary report on the study of winter killing of the fruit buds of the sour cherry (Prunus Cerasus) in Wisconsin. The report gives the amount of killing during the winters of 1915–16 and 1916–17. The fruit buds were killed to a much larger extent on trees whose length growth during the previous season was smallest. On

any tree the larger percentage of buds was killed on the shorter twigs such as those on the lower portion of the tree. Of the spur buds, those on spurs of medium length were killed in largest percentage. The larger buds were killed worse than smaller ones. Buds on trees that had been defoliated by leaf spot were not killed as badly as those on normal trees. The author gives data to show that the killing is determined by the extent of differentiation at the time winter approaches. Defoliation by checking the differentiation left the bud in a hardy condition. Buds of the Early Richmond trees were killed worse than those of Montmorency. In both cases the old trees were killed worse than the younger. The differentiation was generally more advanced at the beginning of winter with the Early Richmond variety. In many cases not all of the flowers in the bud were killed.

268. **Shaw J. K.,** An investigation of the interrelation of stock and scion in apples. Proc. Amer. Soc. Hort. Sci. 14: 59. 1917.—An outline of an investigation which has been under way at the Massachusetts Experiment Station for the past 5 years. It is designed to throw light on the effect on the bearing tree of the varying seedling stocks that commonly are used in growing fruit trees. Twenty-three named varieties of apples have been established on their own roots by means of a deep planted root graft, cutting off the seedling root after the scion has established a root system of its own. Varieties vary greatly in their ability to root from the scion. These own rooted trees have been budded to seventeen different varieties. There are included also trees budded on seedling roots by the ordinary nursery method.—The orchards included in this investigation comprise 1414 trees which have been set from one to three years.—The article includes a brief summary of experiences in securing the trees on their own roots and promises a full report as soon as these experiments are completed.—There seems to be differences in the size of the trees on different roots. A summary of the influences affecting the growth of the trees, omitting the factor of soil and age of the trees as they appear at present, seems as follows: (1) The vigor of the scion variety; (2) The rooting ability of the stock variety; (3) The vigor of the stock variety; (4) In certain cases the compatibility of the stock and scion.—J. K. S.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

[Unsigned abstracts are by the editor.]

269. **Atkinson, G. F.,** Selected cycles in *Gymnoconia peckiana*. Amer. Jour. Bot. 5: 79–83. 1918.—Germination of the aecidiospores of *Caeoma nitens* was found to be "selective," the mode of germination being determined by temperature conditions. When four raspberry plants were kept chilled under bell jars by means of ice during the progress of inoculation (about 60 hours), teleutospores of *Gymnoconia peckiana* resulted in about 1 month on all the plants. The check plants (kept "close beside" the chilled ones under the bell jars) did not develop teleutospores. Earlier experiments by the author (in 1915) had shown that the aecidiospores of *Caeoma nitens* from the dewberry (*Rubus villosus*) would germinate on the surface of water with typical promycelia each bearing four basidiospores. He therefore suggests that the type of rust is dependent on temperature conditions; in the warmer regions south, the spores germinate as promycelia and a one-generation cycle results (*Caeoma nitens*); whereas in cooler regions (as well as in the intermediate regions during colder weather), the aecidiospores germinate by an ordinary long germ tube, and the two-generation cycle results, with the teleutospores of *Puccinia peckiana*.—E. W. Olive.

270. **Bliss, Mary C.,** Interrelationships of the Taxineae. Bot. Gaz. 66: 54–60. *2 pl.* 1918.—The author calls attention to the great divergence of opinion as to the systematic position of the Taxineae, presents evidence for the belief that they are the most modern group of conifers, and by a study of their anatomy throws light on the interrelationships of the three genera of the family. Resin parenchyma, a tissue normally present in all conifers which are without resin canals, was found abundantly in the wood of stem and root in *Cephalotaxus* but was much less abundant in *Torreya*. In *Taxus* it occurs in the root, a region

believed to be conservative. It is normally absent in the stem of this genus, but was found to occur here in wounded regions. The family is therefore regarded as a reduction series, with *Cephalotaxus* as its most ancient genus and *Taxus* as its most modern one.

271. **Flint, Esther Margaret,** Structure of wood in blueberry and huckleberry. Bot. Gaz. 65: 556–559. *2 pl.* 1918.—The author has studied ray structure in the wood of *Vaccinium* and related genera (*Gaylussacia* and *Rhododendron*) and notes the occurrence of two types of rays, uniseriate and broad. The presence in the latter of two kinds of cells, one dark and rather small, the other light and somewhat larger, is cited as proof that these broad rays are compound structures which have originated by the aggregation of small rays and the transformation of fibers into parenchyma. This process the author believes to have been responsible for the formation of broad rays in *Quercus*, and she calls attention to the essential similarity in structure of the broad rays in these two groups of plants.

272. **Kendall, John N.,** Abscission of flowers and fruits in the Solanaceae, with special reference to *Nicotiana*. Univ. of Cal. Publ., Bot. 5: 347–428. *Pl. 49–53, 10 fig.* 1918.—The work is an amplification of that of Goodspeed and Kendall on Nicotiana and an extension of the investigation to other species of the Solanaceae. Abscission is defined as the detaching of an organ by the separation of actively living cells at or near its base. Material from the genera *Nicotiana, Solanum, Cestrum, Lycopersicum, Petunia, Salpiglossis, Datura, Salpichrora,* and *Lycium* was studied. This included 4 species in which floral abscission never occurs, 4 in which it seldom occurs, and 21 which were examined microscopically to determine the strucure of the separation zone and the method of abscission.—The study of the histology and cytology of the pedicel showed that the separation layer arises near the base except in *Lycopersicum* and *Solanum tuberosum* where it is near the middle or at the base of the most distal internode. The separation layer, a portion of the primary meristem which has retained some of its original activity and where cell walls with high water content, hence probably more readily subject to hydrolysis, are found, is preformed ready to function at any time. The internode may be assumed to be a metabolic gradient with the most active cells at the base. In all species, except *Datura*, the separation cells are characterized by their small size, which is not necessarily significant, their isodiametric shape, large amount of protoplasm and somewhat collenchymatous appearance but no chemical differences could be detected to differentiate these cell walls from those of the neighboring cells. The middle lamella near the base of the pedicel seemed somewhat more easily hydrolyzed by acids than in the more distal portions. The grooves near the separation zone in *Nicotiana* and *Lycopersicum* do not necessarily bear any relation to the abscission region. Mechanical tissue in most of the berry-forming species of the Solanaceae does not extend through the abscission zone but in the pedicel of *Nicotiana* it is developed and frequently holds the fruit to the plant in spite of the abscission of the cortex.—The process of abscission involves the separation of the cells along the middle lamella. No cell divisions or elongations were observed as accompanying abscission. All the cells across the separation layer, except the tracheae and cuticle which must be mechanically broken, take part in abscission. The number of cells involved varies in different species and under different external conditions. The actual separation is brought about by hydrolysis and consequent dissolution of the middle lamella and in part of the secondary cell membranes, probably due to the activity of an enzyme which must be extremely sensitive to slight changes in the environment and continually present in the separation zone of plants showing abscission, although it may suddenly cease to be active as for instance after the opening of the flower. An increase in turgor frequently occurs during abscission and probably serves merely to hasten and facilitate the process. Abscission of the style and corolla in *Nicotiana* and *Datura* resembles that of the flower.—The length of time between anthesis and normal flower-fall due to lack of fertilization differs among varieties of *Nicotiana*, ranging from 5 to 18 days. After pollination, 0.7 to 4 days only elapse between anthesis and corolla-fall, the stimulation of the stylar tissue tending to shorten the period of corolla-fall but having no appreciable effect on floral abscission. After 7 hours, shoots subjected to 1.5 percent of illuminating gas at 19°C. have shown abscission. The

actual time for cell separation is about 30 to 60 minutes. The reaction time for flower-fall due to mechanical injury depends on the age of the flower and the type of injury. Temperature is an important conditioning factor. Abscission is assumed to be directly induced by narcotic vapors, injury to floral organs, especially the ovary, sudden rise in temperature and lack of fertilization. Indirectly, changes in soil conditions and factors evident under normal physiological conditions, such as those causing the abscission of male flowers after anthesis, are effective. Abscission may be produced with illuminating gas in small isolated pieces of pedicel or in hand sections. It is thought to be largely independent of such processes as transpiration, a statement which is supported by experiments which show that abscission is not necessarily induced by checking transpiration from the flower. The author concludes that abscission is fundamentally a physiological problem, the crux of which lies in the bio-chemistry of the cells.—ELOISE GERRY.

273. **Loeb, Jacques,** Healthy and sick specimens of *Bryophyllum calycinum*. Bot. Gaz. 66: 69. 1918.—The author suggests that the plant of *Bryophyllum calycinum* described by Miss E. L. Braun (Bot. Gaz. 65: 191. 1918) which produced shoots and roots from leaf notches while the leaves were in connection with the plant, was a sick specimen.

274. **Ludwig, C. A., and C. C. Rees,** The structure of the uredinium in *Pussiniastrum Agrimoniae*. Amer. Jour. Bot. 5: 55–60. *Pl. 8*. 1918.—*Pucciniastrum Agrimoniae* is shown by the authors to have its urediniospores borne in chains, with each chain maturing and detaching only one spore, the terminal, at a time. This work therefore corrects the view presented in the North American Flora, wherein the spores are stated to be borne on pedicels. A new grouping of the Pucciniastratae is therefore suggested: the fern rusts, in which the urediniospores are borne on pedicels; to be separated from *Pucciniastrum, Melamsorella*, etc., in which the urediniospores are borne in chains.—The first peridial cells of *Pucciniastrum* are found to arise, as in the ordinary aecidium, by the transformation of the first-formed cells of the chains. No intercalary cells were formed, nor were any chains found having more than three or four spores.—E. W. OLIVE.

275. **Record, Samuel J.,** Significance of resinous tracheids. Bot. Gaz. 66: 61–67. *5 fig.* 1918.—The author discusses the occurrence of resinous tracheids in the gymnosperms. He presents evidence to show that they represent reservoirs for excretions from the living cells of the wood, and that the characteristic form of the resinous mass (usually a septum or plate) is taken in response to well known physical laws. He believes that the resin-like plates found in the tracheids and vessels of many angiosperms are essentially similar in their origin and significance to the resinous tracheids of gymnosperms.

276. **Steil, W. N.,** Studies of some new cases of apogamy in ferns. Bull. Torrey Bot. Club 45: 93–108. *Pl. 4–5*. 1918.—This paper records the results of 6 years' investigation for the purpose of determining to what extent under normal cultural conditions apogamy occurs in the homosporous leptosporangiate ferns, especially the genera *Pellaea*, *Pteris* and *Aspidium*. The paper contains a summary of the literature of the subject, and adds a number of new species to the list of apogamous ferns. The most satisfactory culture medium was sphagnum saturated with a culture fluid, and kept under bell jars with proper aeration. The species in which apogamy is reported for the first time, are the following: *Pellaea atropurpurea* var. *cristata* Trelease, and *P. viridis* (Forsk.) Prantl.; *Pteris cretica* L. (several horticultural varieties); *Aspidium varium* (L.) Sw.; *A. auriculatum* (L.) Sw., and *A. caryotidium* Wallich; *Cyrtonium Fortunei* J. Sm.—In *Pellaea viridis* two embryos were found in a few cases, one apogamous, the other apparently developed from an egg.—The attempts to induce apogamy in *Nephrodium molle*, and *Asplenium nidus*, as recorded by Yamanouchi and Nagai, were unsuccessful. A similar failure to induce apogamy was experienced with *Osmunda regalis*.

The results of his investigations are summarized by Steil as follows: (1) The prothallia of a number of species of ferns in which apogamy was discovered were grown under cultural conditions favorable for the development of sex-organs and embryos in non-apogamous

species. (2) The prothallia of all the apogamous ferns become heart-shaped before the formation of the embryo. Antheridia are produced on the prothallia of all apogamous forms, but archegonia are formed on the prothallia of only a few forms. (3) The embryo usually appears as a compact region of cells posterior to the apical notch and on the ventral side of the prothallium. In a number of species tracheids are visible among the prothallial cells in the pale portion of the gametophyte. (4) First to make its appearance is the apical cell of the leaf, then that of the root, and later that of the stem. A foot has not so far been observed to develop in connection with the apogamous embryos. (5) Either root or leaf or both of these organs may develop on the dorsal side of the prothallium. As a rule, however, they are produced on the ventral side. (6) While the embryo is produced as a rule posterior to the apical notch, it may be formed on a cylindrical or conical "process" and in some instances on the lobes of the prothallium. (7) Several apogamous embryos may be formed on a single prothallium. (8) As in non-apogamous species, secondary prothallia are readily produced, and these form embryos like those of the ordinary prothallia. (9) The "light" area present on the prothallium of some of the apogamous species is rendered more conspicuous in cultures maintained in weak light. The conical or cylindrical "process" increases considerably in length when the prothallia are grown under these conditions. As a result of weak illumination, the embryo is frequently produced as a direct outgrowth of the apical region of the prothallium. (10) By growing the prothallia of *Osmunda regalis* in strong light and preventing fertilization for a year and a half, no embryos were produced apogamously. (11) An investigation extending over a period of 6 years has resulted in the discovery of apogamy in a large number of ferns. The conclusion that apogamy is of frequent occurrence in the genera *Pellaea*, *Peteris*, and *Aspidium*, is justified on the basis of the many cases so far found in these genera.—DOUGLAS H. CAMPBELL.

277. **Steil, W. N.,** Method for staining antherozoid of fern. Bot. Gaz. 65: 562-563. *1 fig.* 1918.—The author describes a method for the killing and staining of fern antherozoids by the use of osmic acid and safranin which has given excellent results. He describes briefly the structure of the antherozoids thus treated.—E. W. SINNOTT.

278. **Steil, W. N.,** Bisporangiate cones of *Pinus montana*. Bot. Gaz. 66: 68. *1 fig.* 1918.—The author notes the occurrence of a few bisporangiate cones on a specimen of *Pinus montana*. The microsporophylls were borne on the lower portion of the cones, the macrosporophylls on the upper. The sporophylls, sporangia and pollen were apparently normal—E. W. SINNOTT.

PATHOLOGY

DONALD REDDICK, *Editor.*

[Unsigned abstracts are by the editor.]

279. **Anderson, H. W.,** The bacterial shot hole of peach. Trans. Ill. Hort. Soc. 51: 121-128. (1917) 1918.—A description of the disease together with field observations under Illinois conditions. The control by the use of nitrogenous fertilizers and cultivation after the recommendations of Roberts in Bul. 543 U. S. Dept. of Agric. is suggested. Bacterial shot hole or black spot has caused serious damage in southern Illinois peach orchards during the last few years.—H. W. A.

280. **Anderson, H. W.,** Notes on apple diseases in Illinois. Trans. Ill. Hort. Soc. 51: 413-419. (1917) 1918.—Special attention given to body diseases, especially various types of cankers, crown, and root rots. The death of many apple trees in Illinois is caused by agents other than plant pathogenes. The proper treatment of cankers of various types is discussed. Attention called to the seriousness of blister canker (Nummularia) and the New York apple tree canker (*Sphæropsis malorum*) in Illinois orchards.—H. W. A.

281. **Anonymous,** Barberry eradication and rust control. Department of Agriculture and Labor of North Dakota, Special Circ. *4 p. 1 f.* May 15, 1918.—Statement of relation of wheat rust and barberry with call for complete eradication of the latter.—E. S. Reynolds.

282. **Anonymous,** Plant quarantine legislation. Phytopath. 8: 170–172. 1918.—Text of a bill in Congress [U. S. A.] providing for exclusion of nursery stock from importation and a statement of the attitude of the Federal Horticultural Board to the project.

283. **Appleman, Charles O.,** Special growth-promoting substances and correlation. Science 48: 319–320. 1918.—Growth-promoting substance is probably low in potatoes showing spindling sprout disease.—Suggests that the Bryophyllum plants reported on by Braun (Bot. Gaz. 65: 150–174. 1918) probably were unhealthy.

284. **Arthur, J. C.,** Uredinales of the Andes, based on collections by Dr. and Mrs. Rose. Bot. Gaz. 65: 460–474. 1918.—See No. 385.

285. **Ball, E. D.,** Leaf burn of the potato and its relation to the potato leaf-hopper. Science 48: 194. 1918.—A leaf-burn of potato has been widely prevalent in Northern United States. The margins of the leaves turn brown and the dead areas gradually widen until the leaves die. In Wisconsin the extent of the injury was directly proportional to the number of leaf-hoppers (*Empoasca mali*) present. Typical leaf-burn was produced in four days in cage experiments with this insect.

286. **Berger, E. W.,** Termite injury to sweet potatoes. Florida State Plant Bd. Quart. Bull. 2: 190–191. *Fig. 89.* 1918.—Comparison of the injury caused by termites with that caused by weevil, *Cylas formicarius.*

287. **Bisby, G. R. and A. G. Tolaas,** Copper sulphate as a disinfectant for potatoes. Phytopath. 8: 240–241. 1918.—A progress report showing that copper sulfate 3 pounds to 50 gallons of water is somewhat more effective for the control of black scurf (Rhizoctonia) of potatoes than either formaldehyde solution or mercuric chlorid as commonly employed.

288. **Bolley, H. L.,** Control of diseases of farm crops. North Dakota Agric. Exp. Sta Circ. 14: 1–4. 1918.—Concise directions for treatment of grain smuts, seed-born potato diseases and flaxwilt.—E. S. Reynolds.

289. **Boyce, J. S.,** Perennial mycelium of Gymnosporangium blasdaleanum. Phytopath. 8: 161–162. 1918.—Evidence is presented to show that the mycelium of *Gymnosporangium blasdaleanum* is perennial in the wood of *Libocedrus decurrens* and may persist in the vegetative stage for more than 200 years. In addition to witches' brooms the fungus causes spindle-shaped swellings on branches and trunks. The swelling is the result of a decided increase in the development of wood with a negligible increase in the bast. The sapwood and light brown heartwood of the swelling are conspicuously marked with very small dark brown flecks in which mycelium occurs abundantly. No indication of telial sori can be found on the swellings.

290. **Boyce, J. S.,** Imbedding and staining of diseased wood. Phytopath. 8: 432–436. 1918.—Technique for rapid preparation and differential staining of thin sections of dry wood of *Libocedrus decurrens* infected with *Gymnosporangium blasdaleanum.* Method doubtless applicable to other lignified tissues containing fungous mycelium.—Technique for infiltrating with gelatin wood of same host when reduced to a dry and friable condition by *Polyporus amarus.* A differential stain was not found.—A modified method of infiltrating such tissue with paraffin is also described.

291. **Brown, J. G.,** Mistletoe *vs.* mistletoe. Bot. Gaz. 65: 193. *f. 1.* 1918.—*Phoradendron californicum,* a common parasite on Parkinsonia, Prosopis and Acacia was found near Tucson, Arizona, growing on *Phoradendron flavescens* as its host.—H. W. Anderson.

292. **Bureau of Plant Industry,** Plant disease survey. Plant Disease Bulletin 2: 1–18. Mar. 15, 1918.—A summary of the disease survey reports for the month.

293. **Burkholder, Walter H.,** The production of an anthracnose-resistant white marrow bean. Phytopath. 8: 353–359. 1918.—By crossing Well's Red Kidney bean, a variety resistant to the two known biological forms of *Colletotrichum lindemuthianum*, with White Marrow, which is very susceptible to one strain, (F), a strain of the latter variety has been developed which is resistant to both forms of the pathogene. No inoculations were made on the F_1 hybrids, but inoculation experiments conducted on the F_2 generation gave a simple Mendelian ratio of 3:1. Resistance was found to be dominant. Besides the anthracnose resistant White Marrow developed from this cross, resistant strains of several commercial varieties of beans are being isolated. These are the White Kidney, the Vineless Marrow and the Red Marrow.—W. H. B.

294. **Carpenter, C. W.,** Wilt diseases of okra and the Verticillium wilt problem. Jour. Agric. Res. 12: 529–646. *Pl. A and 17–27.* 1918.—The work was undertaken in order to test the theory that there are two similar wilt diseases of the okra induced by two different vascular parasites.—Numerous inoculations and cross inoculations show that *Verticillium albo-atrum* and *Fusarium vasinfectum* are each able to produce a wilt disease of the okra. These diseases can be differentiated only by isolating the causal organism.—In general the Fusarium wilt is more serious in the southern range of okra growing, while the Verticillium wilt is more serious in the northern range of this crop.—It is demonstrated for the first time that cotton may have both of these wilt diseases.—Physiological and morphological studies convince the writer that the genus Acrostalagmus must be united with the older genus Verticillium.—Proper rotation, selection of seed from healthy plants and disinfection of seed are recommended for the control of these diseases.—J. Rosenbaum.

295. **Carpenter, C. W.,** A new disease of the Irish potato. Phytopath. 8: 286–288. *pl. 1.* 1918.—The disease is caused by a mite, possibly of the group Tetranychidæ. It is prevalent in all potato sections of the Hawaiian Islands. The young leaves become bronzed on the lower surface, they twist and curl on the longer axis, become abnormally hirsute and soon dry out and die. Spraying with lime-sulfur solution or dusting with sulfur is a specific.

296. **Dalbey, Nora E.,** Phyllachora as the cause of a disease of corn and a general consideration of the genus Phyllachora. Trans. Ill. Acad. Sci. 10: 230–248. *figs. 1–8.* (1917) 1918.—A disease on corn in Porto Rico caused by a species of Phyllachora similar to P. graminis is described in detail. The question of the validity of the species of this genus as given by Saccardo in "Sylloge Fungorum" is discussed. A table is given illustrating the overlapping of spore measurements and the general confusion which exists in the classification of the genus, Phyllachora. A short bibliography is added.—H. W. Anderson.

297. **Davis, J. J.,** Tilletia on wheat in North Dakota. Phytopath. 8: 247. 1918.—Brenckle's *Fungi Dakotenses* no. 132, is *Tilletia lævis* not *T. tritici*. No. 132a is correctly labeled, *T. tritici*.

298. **Doidge, E. M.,** Potato diseases I: Early blight or leaf curl, Macrosporium solani E. & M. Union S. Afric. Dept. Agric. Bull. Local Series 26. 1918.

299. **Doidge, E. M.,** Potato diseases II: Scab. Actinomyces chromogenus Gasp. South African Fruit Grower 4: 128. 1918.

300. **Doidge, E. M.,** Potato diseases III: Corky or powdery scab, Spongospora subterranea. (Wallr). Johns. South African Fruit Grower 4: 153. 1918.

301. **Duff, George H.,** Some factors affecting viability of the urediniospores of Cronartium ribicola. Phytopath. 8: 289–292. *fig. 1.* 1918.—Urediniospores of *C. ribicola* kept in a low temperature (2–5°C.) incubator were tested at intervals for viability. Germination

could not be induced after 12 weeks. Glass-filtered sunlight at temperatures below 20°C. stimulated germination. Exposure to an electric arc for about 1 hour at a distance of 40 cm. and at a temperature below 20°C. completely inhibited germination. Ultra-violet rays are thought to be responsible. In general the viability of urediniospores is found to be low.

302. **Edgerton, C. W.,** Bean pod meal for culture media. Phytopath. 8: 445–446. 1918. —Pick the pods in season, cut into small pieces, dry to crispness with artificial heat. Grind to a fine meal and store in glass. Twenty grams of meal is sufficient for 1 l. of medium. Soak the meal 30 minutes in water at 50 to 60°C., filter and proceed as usual.—Tests with various organisms have shown identical growth on agar made from meal and from fresh pods.

303. **Elliott, John A.,** Nematode injury to sweet potatoes. Phytopath. 8: 169. *f. 1.* 1918.—Nematodes found to the depth of 3 cm.

304. **Federal Horticultural Board** [U. S. A.], Service and regulatory announcements. November: 135–142. Jan. 7, 1918. December: 143–148. Feb. 13, 1918.

305. **Federal Horticultural Board** [U. S. A.], Quarterly letter of information No. 25. *p. 23.* Oct., 1917.—Continuation of news letter.

306. **Fitzpatrick, H. M.,** The life history and parasitism of Eocronartium muscicola. Phytopath. 8: 197–218. *Pl. I., fig.* 4. 1918.—Examination of type specimens has demonstrated the identity of *Eocronartium typhuloides* Atk., *Typhula muscicola Fr.*, and *Clavaria muscigena* Karsten. The new combination *Eocronartium muscicola* (Fries) is proposed.—The fungus is demonstrated to be an obligate parasite, a fact of interest in the light of its close relationship with the rust fungi. The mycelium is intracellular, and traverses all parts of the host, practically every cell being invaded. Diseased plants are normal in appearance, and invaded cells contain unaltered nuclei and cytoplasm. The mycelium is perennial, advancing each year into the embryonic tissue of the new branches. Attempts to grow the fungus on culture media failed. Although the spores germinate, and develop short germ tube growth soon ceases. Artificial inoculations were unsuccessful.—The other known cases of parasitism in the Auriculariaceæ are discussed, and the suggestion is advanced that the Uredinales originated from auriculariaceous fungi parasitic on mosses.—H. M. F.

307. **Fracker, S. B.,** Effect of crown gall on apple nursery stock. Phytopath. 8: 247. 1918.—The presence of crown gall or hairy root on apple nursery stock in Wisconsin causes a reduction in value of from 17 to 18 percent. Details are given in Jour. Econ. Entom. 11: 133–135. 1918.

308. **Gilbert, W. W., and M. W. Gardner,** Seed treatment control and overwintering of cucumber angular leaf-spot. Phytopath. 8: 229–233. 1918.—Epiphytotics of angular leaf-spot, caused by *Bacterium lachrymans*, may originate either from contaminated seed or from infested soil. Seed disinfection reduces the incidence of the disease nearly one-half. The use of treated or of disease-free seed in fields well removed from previous cucumber patches is recommended as a control measure. The seed is immersed in mercuric chlorid, 1–1000, for five mintues and is then washed with water for 15 minutes.

309. **Gillespie, L. J.,** The growth of the potato scab organism at various hydrogen ion concentrations as related to the comparative freedom of acid soils from the potato scab. Phytopath. 8: 257–269. 1918.—Various strains of *Actinomyces chromogenus* of known pathogenicity were tested for their tolerance of acid in culture media adjusted to various hydrogen ion exponents. Two of the media were synthetic, designated as citrate and succinate; the third was made with potato broth and is designated as potato-tartrate. Methods of preparation and standardization are explained fully. The organism grew well in a neutral medium but made practically no growth at a hydrogen ion concentration represented by the exponent 5.1 and none at all at 4.8.—The hydrogen ion concentration decreased during growth. The greatest change occurred in the potato-tartrate medium, the changes in exponent ranging from 0.3 to 2.32.

310. **Glaser, R. W.,** The polyhedral virus of insects with a theoretical consideration of filterable viruses generally. Science 48: 301–302. 1918.—Passage experiments with gypsy moth larvae which seem to demonstrate that the wilt disease of larvae is not caused by an enzyme but by an ultra-microscopic organism, which is capable of passing through a coarse (N) Berkefeld filter. The virus gained in virulence in the fourth passage (the interval from infection to death was reduced). Since certain substances, like chromatin, increase progressively, author resorts to a comparison with other filterable virus diseases in some of which an organism has been cultured, and presents a table summarizing the characteristics of this virus.—Author believes that filterable viruses probably realize Osborn's "hypothetical chemical precellular stage."

311. **Gravatt, G. Flippo, and G. B. Posey,** Gipsy-moth larvae as agents in dissemination of the white pine blister rust. Jour. Agric. Res. 12: 459–462. 1918.—The larvae of the gipsy moth (*Porthetria dispar*) are found to feed on both the spores and hyphae of the aecial stage of *Cronartium ribicola*. In many cases spore production is stopped by the destruction of fruiting hyphae. The alimentary tracts of larvae taken from rust pustules were found to contain as many as 48,000 and an average of 26,000 spores each. Examination of the excreta indicated the passage through the intestines of over 300,000 spores per day. Germination tests indicated, but did not conclusively prove, injury to the spores in passing through the larvae. Thousands of spores were also found adhering to the bodies of the larvae. They feed on the leaves of Ribes and infections on Ribes have apparently been traced to such feeding. As the larvae are known to be sometimes carried by wind as far as twenty miles, they become possible agents of long-distance as well as short-distance spread of the disease within the area infested by the gipsy moth.—Carl Hartley.

312. **Gunderson, A. J.,** Results of spraying experiments at Flora. Trans. Illinois Hort. Soc. 51: 406–412. (1917) 1918.—Experiments were conducted especially in an effort to find a satisfactory spray schedule for control of apple blotch caused by *Phyllosticta solitaria*. It was found useless to attempt to kill the fungus in the cankers by use of dormant sprays including "scalecide." The use of lime-sulfur spray 3 and 5 weeks after the fall of the bloom successfully controlled blotch under conditions in 1917. Blotch was not controlled by dusting with sulfur.—H. W. Anderson.

313. **Güssow H. T.,** A new method for "hanging drop" cultures. Phytopath. 8: 447. 1918.—The drop is flattened out in a thin film by placing a small cover glass on it. The method possesses possibilities for the study of anaerobic organisms.

314. **Güssow, H. T.,** Microphotography simplified. Phytopath. 8: 447–448. 1918.—Method of making photomicrographs is described. A simple drawing apparatus is used, superfluous light is excluded and photographic paper is substituted for drawing paper. This gives negative prints.—Additional apparatus is described for making exposures on photographic dry plates.

315. **Headlee, Thomas J., Geo. A. Dean and E. D. Ball,** Report of the special committee appointed to formulate the attitude of the American Association of Official Horticultural Inspectors on the question of prohibiting importation of nursery stock from foreign countries. Phytopath. 8: 170. 1918.—Resolutions favoring prohibition.

316. **Henderson, M. P.,** The black-leg disease of cabbage caused by Phoma lingam (Tode) Desmaz. Phytopath. 8: 379–431. *10 fig.* 1918.—A monographic treatise.—Purpling of foliage is not a good diagnostic character.—Fungus produces sub-epidermal ostiolate pycnida on living tissue and superficial, beaked pycnidia on dead parts.—Mycelium intercellular at first becoming intracellular and causing collapse of tissue.—*Phoma oleracea* and *P. brassicæ* are synonyms, possibly also *P. napobrassicæ*. "*P. oleracea*" on *Meliotus alba* is distinct.—Fungus is a vigorous parasite, infection resulting readily from wound inoculations, spraying on a spore suspension, wetting roots in a spore suspension at time of transplanting or wetting

seeds with suspension at planting time.—Incubation period varies from 7 to 28 days. Many cultivated varieties of Brassica are susceptible as well as wild species of this and other cruciferous genera.—Mother seed plants are susceptible in all parts and the mycelium may pass through the wall of the silique into the young seeds where it persists until the following year. Aside from perennation in the seeds the fungus persists over winter in dead plant parts.—Surface disinfection of seed is accomplished best by treatment for 21 minutes in 1:200 solution of 40 percent formaldehyde.—Spraying seed-bed and seedlings with Bordeaux mixture is not effective.—Removal of diseased host tissue with a fine screen prevents infection in the seed-bed.—Covering badly diseased host tissue with 4 inches or more of uncontaminated soil yields diseased-free seedlings.—Removal of diseased plants and deep, fall plowing suggested for control in field.

317. Hoffer, G. N., and J. R. Holbert, Results of corn disease investigations. Science **47**: 246–247. 1918.—Occurrence of barren stalks and stalks bearing only nubbins is correlated with certain pathological conditions in the plants. In corn grown from ears which presented this pathological condition in seedlings, 15 percent of plants were barren compared with 6 percent from ears not revealing this condition.—Diseased seedlings develop from seeds disinfected externally and grown in flasks of sterilized agar. Bacteria appear which rot seedling root tips. Species of Fusarium also appear. Selfed plants from disease-free seedlings gave only 1.5 pereent barren plants.—All kernels on any one ear are not infected internally.

318. Holton, John C., The theory and practice of sanitary precautions in grove and packing house operations. Florida State Plant Bd. Quart. Bull. **2**: 161–179. 1918.—50 percent of the citrus packing house operators followed regulations of the Board.—Data on practical operation of application of sanitary measures in packing house operations.

319. Holway, E. W. D., Infected grass seeds and subsequent rust development. Phytopath. **8**: 169. 1918.—Quotation from McAlpine, the Rusts of Australia. *Puccinia beckmanniae* developed in Australia on plants grown from seeds of *Beckmannia erucaeformis* Host. sent there from U. S. A. In the same way *Puccinia impatientis* was carried with seeds of *Elymus condensatus*.

320. Hungerford, Chas. W., Field conference of cereal pathologists. Science **48**: 148–150. Aug. 9, 1918.—Brief summary reports of progress on investigations by various workers and discussions of methods of control of cereal diseases. The following subjects are considered: Barberry eradication, stem rust (*P. graminis*), leaf rust (*P. triticina*), bacterial diseases of cereals, smuts, smut eradication, seed treatment methods. Resolutions were adopted (1) endorsing the barberry eradication campaign as a means of reducing the amount of stem rust and (2) recommending to the Federal Horticultural Board the use of proper precautions to prevent the possible introduction of certain wheat diseases on grain from Australia.

321. Jones, L. R., Disease resistance in cabbage. Nat. Acad. Sci. Proc. **4**:42–46. 1918. —Jones reports that by selecting fifty individual cabbage plants which were most resistant to the attacks of *Fusarium conglutinans* as judged by their behavior on "cabbage sick" soil in 1910, he was able to obtain, in the second generation, from these, individual strains which are highly resistant and of commercial value. His results show that the disease resistant character is fixed and heritable. Better resistance was obtained in the second than in the first generation from selected individuals. The variation in susceptibility shown by individuals of the second generation suggests that further improvement may be possible through continued selection.—The author comments on the work of W. H. Tisdale which seems to show that the parasite invades root tissues of resistant cabbages more slowly than in the case of susceptible plants. He also refers to the experiments of J. C. Gilman which indicate that under 17°C. the fungus is not able to attack the most susceptible plants.—L. O. Kunkel.

322. Jones, L. R., and W. W. Gilbert, Lightning injury to herbaceous plants. Phytopath. **8**: 270–280. *2 fig.* 1918.—A record of observations by the authors and others of the effect of strokes of lightning on potato, cotton, tobacco, cucumber and tomato. Killed

'eas vary in diameter from 10 to 30 feet and are roughly circular in outline. There is usually marginal band of partially killed plants. The greatest damage seems to occur when the roke occurs soon after rain begins and the explanation is offered that moist surface soil, ıderlaid by dry soil, would favor wider diffusion of the shock. The balance of evidence is favor of the conclusion that certain herbaceous crops, e.g., potatoes, sugar beets and ›tton, suffer more regularly and seriously from lightning stroke than others, e.g., cereal and ›rage crops.

323. **Lewis, A. C.,** Facts of interest about the Georgia State Board of Entomology. eorgia State Bd. Ent. Circ. 28: 1-12. 1918.—Popular account of work in the control of disases and insects.

324. **Long, W. H., and R. M. Harsch,** Aecial stage of Puccinia oxalidis. Bot. Gaz. 65: 75-478. May, 1918.—An undescribed *Aecium* on *Berberis repens* near Albuquerque, New [exico, was found in close association with *Oxalis violacea* upon which occurred urediniospores f *Puccinia oxalidis*. Field and laboratory experiments proved the relation between the wo. *Puccinia oxalidis* therefore has its pycnia and aecia on *Berberis repens* while uredinia nd telia occur on *Oxalis violacea* and other species.—H. W. ANDERSON.

325. **Long, W. H., and R. M. Harsch,** Pure cultures of wood-rotting fungi on artificial ıedia. Jour. Agric. Res. 12: 33-82. 1918.—Cultures of hymenomycetes were grown on plant ıfusion agar media. The color of the submerged mycelium, the color and general appearance f the aerial mycelium, and certain other characters, were found to have diagnostic value. ome of the vegetative cultural characters of several polypores are shown in tabular form to lustrate the information which the behavior of artificial cultures may give as to the relationıips of fungi from different sources. Characters of artificial cultures are especially valuable ›r the identification of the causal organisms in decayed wood on which no sporophores have een formed.

The production of sporophores in artificial culture gives additional data for identification. 7hile the writers were unable to secure any entirely typical pilei, forty-two species, repreenting four different hymenomycetous families, were induced to form sporophores on utrient agar in 20 mm. tubes. Carrot, malt, and parsnip agars were found best adapted ›r this phase of the work. Rather strong light proved especially favorable to sporophore roduction although three species were induced to fruit in darkness. The position of the ileus was determined by the direction of the source of light, while gravity was the deterıining factor in the position of pores. The use of small fragments of sporophore in inocuıting the agar resulted in especially prompt formation of sporophores. It also resulted in ›orophore production on media on which none were produced following inoculation with ›ores or mycelium.—CARL HARTLEY.

326. **Lyman, G. R.,** The relation of phytopathologists to plant disease survey work. hytopath. 8: 219-228. 1918.—A description of the scope, operation and aims of the federal lant disease survey, or intelligence service, and a plea for coöperative endeavor.

327. **Lyman, George Richard,** Plant disease survey work on the Physoderma disease of ıaize. Journ. Wash. Acad. Sci. 8: 43-44. Jan. 19, 1918.—Abstract of paper read before the otanical Society of Washington, Nov. 6, 1917.

328. **MacInnes, F. J.,** The occurrence of Alternaria in a characteristic apple spot and an pple rot caused by Gliocladium viride. Trans. Illinois Acad. Sci. 10: 218-229. *Pl. I-IV*. 1917) 1918.—An Alternaria was found associated with a peculiar lesion on a number of apples btained from an orchard near Harristown, Illinois. The spots vary from 2 mm. to 3 cm. in iameter and penetrate the flesh only to a depth of about 2 mm. No inoculation studies are ›ported.—A fungus found in plates made from rotting apples and determined by Dr. Chas. 'hom to be *Gliocladium viride* was found to cause a soft rot when inoculated into ripe apples. -H. W. ANDERSON.

329. **Martin, W. H.,** Dissemination of Septoria lycopersici Speg. by insects and pickers. Phytopath. 8: 365–372. 1918.—After the diseases appear in the field insects captured either on diseased or healthy plants are shown to carry, in large numbers, spores of *Septoria lycopersici* and of *Alternaria solani*. The insects examined were *Leptinotarsa decemlineata* larvae and adults, and *Protoparce carolina*.—Insect excreta removed from healthy plants was examined and spores of the two organisms found in small numbers, some of them germinating. Experiments in moist chambers confirm the results of field tests.—Spores of these two parasites were found abundantly on the hands and garments of pickers and it is believed that epiphytotics are brought about through this agency.

330. **Martin, George W.,** Brown blotch of the Kieffer pear. Phytopath. 8: 234–239. *f. 1–8.* 1918.—The lesions are superficial and at first circular with indefinite margins. By fusion large irregular blotches, covering a part or all of the fruit, are formed. They resemble the natural russet coat of certain varieties. A fungus, closely related to *Leptothyrium pomi*, is said to cause the disease. The mycelium and sclerotia, however, are not superficial but are imbedded in the cutin and cause excessive suberization and hypertrophy of subcuticular layers of the fruit. The disease is best controlled by two late (July and August) treatments of Bordeaux mixture.

331. **Matz, J.,** Diseases and insect pests of the pecan. Florida Agric. Exp. Sta. Bull. 147: 135–162. 1918. (Part I.—Diseases, p. 135–150.) A compilation on several common pecan diseases, with special attention to symptoms and control measures.—L. R. HESLER.

332. **Matz, J.,** Report of laboratory assistant in plant pathology. Florida Agric. Exp. Sta. Rept: 1917: 87R–94R. 1918.—Two pecan diseases are discussed, dieback, which is evidently due to *Botryosphæria berengeriana*, and a leaf spot, proved to be caused by an undescribed species of Gnomonia.—L. R. HESLER.

333. **Matz, J.,** A method for making permanent mounts of entire colonies of some fungi in plate cultures. Phytopath. 8: 446–447. 1918.—A thin film of medium is used. Organism is allowed to spread over medium and up the side of the plate. The medium is allowed to dry out and is then dissolved away with boiling water. The mycelium remaining is dehydrated with alcohol and may be stained if desired.

334. **McClintock J. A.,** Further evidence relative to the varietal resistance of peanuts to Sclerotium rolfsii. Science 47: 72–73. 1918.—Variety "Virginia bunch" is susceptible, variety "Virginia runner" practically immune.

335. **McCubbin, W. A.,** Public school survey for currant rust. Phytopath. 8: 294–297. 1918.—The machinery of the public school system was employed to make a survey for the currant rust, *Cronartium ribicola*. Form letters are reproduced. Comparison of effectiveness of survey by school children and by professional scouts indicates that the former is much more effective.

336. **McCulloch, Lucia,** A morphological and cultural note on the organism causing Stewart's disease of sweet corn. Phytopath. 8: 440–442. *Pl. 1.* 1918.—Organism is without flagella and is referred to as *Aplanobacter Stewarti*.—Organism produces two distinct types of surface colonies on peptonized beef agar plates. One has a smooth flat surface, the other a definite central depression. No other known difference exists. All the colonies of any one isolation are of the same type.

337. **Miles, L. E.,** Some new Porto Rican fungi. Trans. Ill. Acad. Sci. 10: 249–255. *fig. 1–3.* (1917) 1918.—Nine new species of Mycosphaerella and one each of Helminthosporium and Cercospora are described.—H. W. ANDERSON.

338. **Miller, F. H.,** Disease control and forest management. Jour. Forestry 15: 974–977. 1918.—The author discusses briefly the effect of forest tree diseases upon forest management. "The combining of disease control with intensive forest management calls for an adjustment

of the rotation, cutting cycle, and marking rules in such ways as, in the case of enphytotics, to control the disease by measures of sanitation, and by limiting the felling age so that loss is minimized; and in the case of epiphytotics, to make 'sanitation' cuttings, or damage cuttings, or both, and employ certain silvicultural measures, such as the substitution of other species which are more resistant or immune." An example is given of a working plan for a forest in Saratoga Co., New York, which takes into account the chestnut blight and apparently the white pine blister rust. The paper is largely based on previous papers by Meinecke and by Recknagel.—HAVEN METCALF.

339. **Murphy, Paul A., and E. J. Wortley,** Determination of the factors inducing leafroll of potatoes particularly in northern climates. First progress report. Phytopath. 8: 150–154. 1918.—The work shows that healthy plants grown in rows and separated from diseased hills by 30 inches only, developed the disease to the extent of 89.5, 50, and 19.4 per cent, respectively. The probability of the spread of the disease from certain centers has endangered the safety of hill selection and to eliminate the danger from infection, it is advised that in experiments the rows be at least six feet apart.—ERNST ARTSCHWAGER.

340. **O'Gara, P. J.,** The white-spot disease of alfalfa. Science 48: 299–301. 1918.—Disease is found to be prevalent and troublesome in the western States. Basing statement on data which are not presented author concludes that the spots are due to a disturbance of physiologic balance between water absorption and transpiration.—C. T. GREGORY.

341. **Osner, Geo. A.,** Additions to the list of plant diseases of economic importance in Indiana. Proc. Indiana Acad. Sci. 1916: 327–332. (1917) 1918.—A record of fifty-three diseases of cultivated plants not previously reported from Indiana. [Supplementary to: Pipal, F. J., A List of Plant Diseases of Economic Importance in Indiana. Proc. Indiana Acad. Sci. 1915: 379–413. 1916.]—H. S. JACKSON.

342. **Parker, J. H.,** Greenhouse experiments on the rust resistance of oat varieties. U. S. Dep't. Agric. Bull. 629: 1–15. *pl. 1–2, f. 2.* 1918.—Tests of the resistance of oat varieties to crown rust (*Puccinia lolii avenae* McAlpine) and stem rust (*Puccinia graminis avenae* Erikss. and Henn.). Both of these rusts are widely distributed in the United States but stem rust causes the greater loss in the northern states while crown rust does more damage in the South. Resistance is judged by length of incubation period, formation of flecks or large dead areas, small uredinia, small number of uredinia and in the case of crown rust the production of normal telia on the seedling leaves. Of 122 varieties tested, 80 showed no resistance to either rust. 16 out of 23 varieties belonging to the red oat group showed some resistance to crown rust. Several varieties of this group were very susceptible to crown rust and all were susceptible to the stem rust. White Tartarian and Ruakura were the only varieties showing any resistance to stem rust.—L. O. KUNKEL.

343. **Peltier, George L. and David C. Neal,** A convenient heating and sterilizing outfit for a field laboratory. Phytopath. 8: 436–438. *2 fig.* 1918.—Small autoclave now on market for home canning purposes is heated with a blue flame gasoline burner.

344. **Perrine, W. S.,** Adjusting the spray schedule on certain varieties of apples. Trans. Illinois Hort. Soc. 51: 388–398. (1917) 1918.—Each variety of apple varies in its relative susceptibility to blotch, scab, and codling moth. Some varieties are seriously injured by spray mixtures that cause no damage to others. On this account it is shown that it pays to consider the varieties individually in spraying. Schedule for Transparent, Duchess, Grimes, Jonathan, Chenango, York Imperial, Benoni, and Ben Davis are discussed.—H. W. ANDERSON.

345. **Perrine, W. S.,** Orchard spraying. Trans. Illinois Hort. Soc. 51: 265–274. (1917) 1918.—A discussion of apple spraying from the standpoint of the practical orchardist.—H. W. ANDERSON.

346. **Pickett, B. S.,** Spraying apples. Trans. Ill. Hort. Soc. 51: 328–338. (1917) 1918.—The fundamental principles of spraying are discussed.—H. W. ANDERSON.

347. **Pickett, B. S., O. S. Watkins, W. A. Ruth and A. J. Gunderson,** Field experiments in spraying apple orchards in 1913 and 1914. Illinois Agric. Exp. Sta. Bull. 206: 427–509. *f. 1–6.* Apr., 1918.—A detailed account is given of spraying experiments at Neoga, Flora and Griggsville. The financial gain through spraying is demonstrated. Lime-sulfur solution proved to be better than Bordeaux mixture as a spray on account of the foliage and fruit injured by the latter. A number of brands of arsenate of lead were tested, demonstrating that all the standard brands are about equally effective. New and proprietary fungicides were shown to cost more and as a rule were less effective than known standard mixtures. It was demonstrated that high pressures give more effective control than low pressures and do not cause injury where the quantity of spray applied is controlled. The authors recommend the use of lime-sulfur solution for the cluster bud, calyx and other sprays applied in May or during cool weather in June but recommend Bordeaux mixture for hot weather in June and during remainder of the season. Recommendations based on these experiments are given in the form of a spray schedule.—H. W. ANDERSON.

348. **Pierce, Roy G.,** Notes on Peridermiums from Ohio: Need of pathological viewpoint in nursery inspections. Phytopath. 8: 292–294. 1918.—*Peridermium carneum* is reported from various places in Ohio on species of Pinus including *P. austriaca* and *P. laricio*. *Coleosporium vernoniæ*, II, was found later in the year on *Vernonia maxima* in close proximity to one of the diseased pines.—*Peridermium comptoniæ* is reported on two species of Pinus apparently brought in one diseased nursery stock.

349. **Pipal, F. J.,** The effect of hydrogen peroxide in preventing the smut of wheat and oats. Proc. Indiana Acad. Sci. 1916: 378–381. (1917) 1918.—Hydrogen peroxide reduced percentage of stinking smut of wheat, *Tilletia fœtens*, by about one-half, when diluted one to ten, and about one-third when used full strength. It was partially effective in controlling the oat smuts, *Ustilago avenæ* and *U. lævis*, when diluted 1:15 and 1:10 or when used full strength. Hydrogen peroxide, however, did not compare favorably with the standard formaldehyde treatment.—H. S. JACKSON.

350. **Potter, Alden A.,** The effect of disinfection on the germination of cereal seed. Phytopath. 8: 248–249. 1918.—A critique of methods of sampling based on the idea that the purpose of testing effect of disinfection on germination of seed is to determine what proportion of viable seed contained in original sample has been killed by treatment, and not to discover what proportion of whole lot is viable after treatment.

351. **Reddick, Donald,** Lightning injury to grape vines. Phytopath. 8: 298. 1918.—When lightning strikes in a grape trellis varying degrees of injury to the vines result. In the case of light strokes the vines of the trellis may show partial wilting with subsequent recovery or the plants may be killed to the ground, the roots, however, remaining uninjured.

352. **Reddick, Donald,** Palladin's Plant Physiology. (Review.) Phytopath. 8: 373. 1918.

353. **Reddick, D.,** Annals of the Phytopathological Society of Japan. (Review.) Phytopath. 8: 444–445. 1918.

354. **Rhodes, Arthur S.,** Some new or little known hosts for wood-destroying fungi II. Phytopath. 8: 164–167. 1918. The fungi reported are *Schizophyllum commune* on *Pinus virginiana*, *Pleurotus serotinus* on *Tsuga canadensis*, *Hymenochæte agglutinans* on *Morus rubra* and *Liquidambar styraciflua*, *Stereum* sp. on *Ginko biloba*, *Guepinia spathularia* on *Juniperus virginiana*, *Polyporus dichrous* on *Picea rubens*, *P. obtusus* on *Fagus atropunicea*, *P. versicolor* on *Ginko biloba*, *P. hirsutus* on *Ginko biloba*, *P. pargamenus* on *Pinus virginiana* and *P. gilvus* on *Rhus toxicodendron*.

355. **Rhodes, Arthur S., George G. Hedgcock, Ellsworth Bethel and Carl Hartley,** Host relationships of the North American rusts, other than Gymosporangiums, which attack conifers. Phytopath. 8: 309–352. 1918.—The previously published facts and much new information concerning 52 species (in 14 genera) of the rust fungi are here brought together. The pathological significance of these rusts and other generalizations are made clear in the introduction. Complete information concerning the synonomy, citations to literature, the known hosts and the distribution of each species are given together with a brief summarization of the experimental work establishing the cycle of spore forms. The unconnected aecial forms are treated similarly. A list of the unattached rusts aecia of which are likely to be found on conifers is given. A host index by species for the conifers and by genera for the dicotyledons is given for all the rust fungi included in the paper. A bibliography of 148 titles is appended.—W. H. RANKIN.

356. **Rolfs, P. H.,** Citrus diseases. Florida Agric. Exp. Sta. Rept. 1917: 10R–11R. 1918. —A brief summary of the work performed by the staff in plant pathology. [See Bot. Absts. 1, 330, 331, 358–360, 368.]

357. **Sharples, A.,** Ustulina zonata (Lev.) Sacc. on Hevea brasiliensis. Ann. Appl. Biol. 4: 153–178. *Pl. 3–8.* 1918.—Fungus, which is common on felled trunks and stumps of rubber and other soft-wood trees, causes a disease of rubber trees known as collar rot. Disease has been prevalent in F. M. S. since 1912 and is now widespread in old plantations. Injury usually confined to an area at collar but fungus may spread up or down for several feet. Foilage becomes sparse and latex can not be obtained from the side of tree on which lesion occurs.—Shot-hole borer (Xyleborus parvulus) makes infection courts.—Complete description of fungus in all stages, cultural characters, pathological histology and an account of inoculation experiments.—Recommendations for control based on observations and deduction consist essentially of employing sanitary measures.—Paper closes with a strong appeal for coordinated fundamenatal research on the part of the British government, of numerous problems of the rubber industry.

358. **Shear, C. L.,** Pathological aspects of the federal fruit and vegetable inspection service. Phytopath. 8: 155–160. 1918.—In order to protect and conserve perishable crops to the fullest extent they must be studied in transit and distribution, and a thorough knowledge obtained of the rots and other forms of spoilage which so frequently occur after the product has left the grower. The practical execution of the Food Products Inspection Law of August 10, 1917, is explained and estimates of losses in transit given. The greatest success in carrying out the project can be obtained only by active and sympathetic cooperation of growers, shippers, carriers, distributors, inspectors and pathologists.

359. **Sherbakoff, C. D.,** Report of associate plant pathologist. Florida Agric. Exp. Sta. Rept. 1917: 76R–86R. 1918.—Chief attention is given to seed-bed diseases of vegetables, tomato buckeye rot and pineapple wilt. It is found that *Rhizoctonia solani* is the most common damping-off fungus. The author concludes that it occurs in new soil and that it is at times introduced into the seed-bed with seed. Similarly *Phomopsis vexans* is carried into the seed-bed with the seed. In the field the latter organism causes an undescribed disease of eggplant called tipover. Preliminary studies on a little-known bacterial spot of pepper are reported. Pink joint, also a disease of pepper, is regarded as possibly due to *Sclerotinia libertiana.* Appended are brief notes on other important diseases of tomato, potato, pepper, celery and watermelon. Progress is reported on pineapple wilt (possibly due to nematodes).—L. R. HESLER.

360. **Sherbakoff, C. D.,** Some important diseases of sweet potato. Florida State Plant Bd. Quart. Bull. 2: 179–189.—Compiled.

361. **Sherbakoff, C. D.,** Tomato diseases. Florida Agric. Exp. Sta. Bull. 146: 119–132. *fig. 32–42.* 1918.—Descriptions and illustrations of the diseases of tomatoes occurring in Florida

with recommendations for control. Causal organisms not mentioned except in names of the diseases. Diseases discussed are: bacterial blight, septorial blight, sclerotial blight, Phytophthora blight, fusarial blight, macrosporial blight, Phoma spot, buckeye rot (*Phytophthora terrestria*), brown rot (*Rhizoctonia solani*), bacterial soft rot, blossom-end rot, root knot.—I. C. JAGGER.

362. **Smith, Erwin F., and G. H. Godfrey,** Brown rot of Solanaceae on Ricinus. Science 48: 42–43. 12 July, 1918.—*Bacterium solanacearum* attacks the castor oil plant (*Ricinus communis*) in various stages of growth producing a wilt. Evidence is presented to prove the identity of the organism. Land on which any of the common solanaceous plants have wilted should not be planted to Ricinus.

363. **Smith, Ralph E.,** The beet leafhopper and the curly-leaf disease that it transmits. [Review of Utah Agric. Exp. Sta. Bull. 155.] Phytopath. 8: 168. 1918.

364. **Spaulding, Perley,** Some biological aspects of the spread of the white pine blister rust. Jour. Washington Acad. Sci. 8: 40–41. 19 Ja 1918.—Abstract of paper read before Biological Society of Washington, Nov. 17, 1917.

365. **Stakman, E. C., and C. R. Hoerner,** The occurrence of Puccinia graminis tritici-compacti in the southern United States. Phytopath. 8: 141–149. 1918.—The biologic form of *Puccinia graminis tritici*, has been found in the states of Washington, Oregon, Alabama, Louisiana, south-eastern Texas, and possibly Virginia.

Extensive infection experiments demonstrate that the southern and northern strains of *Puccinia graminis tritici-compacti* are the same. The difference between this form and *P. graminis tritici* is constant, not a local variation. In the majority of the varieties and species of wheat tested there is evident a very decided difference in the pathogenicity of the two biologic forms. The varieties which are susceptible to *P. graminis tritici* are usually resistant to *tritici-compacti*. There are indications that resistance to *tritici-compacti* varies directly with the hardness of the wheat. Note is made of the fact that the southern wheats are largely soft whereas the northern spring wheats are hard. This may have especial significance in epiphytology studies.—Morphologically the spores of *tritici-compacti* are distinctly different from those of *P. graminis tritici* and can be readily distinguished by measurement. —The suggestion is made that the *tritici-compacti* form of *P. graminis* is present in the south whereas *P. graminis* is prevalent in the north. This may be evidence that the south to north dissemination of this fungus does not occur.—C. T. GREGORY.

366. **Stevens, F. L.** Porto Rican fungi, old and new. Trans. Illinois Acad. Sci. 10: 162–218. *figs*. 1–13. (1917) 1918.

367. **Stevens, F. L., and H. W. Anderson,** Protect the wheat crop. Eradicate the common barberry from Illinois. Univ. Illinois Col. Agric. Extension Circ. 22: 1–4. *f. 3*. 1918.

368. **Stevens, H. E.,** Lightning injury to citrus trees in Florida. Phytopath. 8: 283–285. 1 *fig*. 1918.—Injury is of fairly frequent occurrence and not confined to any one region. From a few to thirty trees may be injured at one stroke. When the trunk is struck the injury is represented by a narrow strip of dead bark, 1 to 5 cm. or more in width, extending downward to the surface of the soil. At the base of the trunk the injured area may extend to completely girdle the tree. The tissue is killed down to the hardened xylem.

Usually one or two trees are severly injured or killed. Adjacent trees show injury on scattered twigs and branches where characteristic spots or blotches are produced. The spots are greenish-yellow and vary in size and shape. They may involve a few square millimeters or may extend 10 cm. and envelop the twig. Usually the injured areas are superficial. Injured areas are usually invaded by fungi.

369. **Stevens, H. E.,** Report of plant pathologist. Florida Agric. Exp. Sta. Rept. 1917: 66R–75R. 1918.—The report covers citrus diseases. The cause of gummosis remains un-

solved. Young lesions yield no organisms although *Phomopsis citri*, *Diplodia natalensis* and several other organisms are associated with older spots. Inoculation experiments were unsatisfactory. Pruning offers promise for the control of melanose. Tests show that the citrus canker organism (*Ps. citri*) not only survived 26 months in relatively dry soil but retained its pathogenicity. Studies indicate that *Phytophthora terrestria* may cause foot rot. Brief notes are given on anthracnose, withertip, scab and an apparently new fruit spot.—L. R. Hesler.

370. **Stewart, V. B.**, Exclusion legislation and fruit tree production. Phytopath. 8: 160–164. 1918.—It appears unwise to prohibit importation of living plants when such plants can not be produced successfully at home. Attempts in U. S. A. to grow many kinds of fruit tree seedlings have usually resulted in plants inferior to foreign-grown stock. American growers of seedling stock are largely dependent on imported seed.—Crown gall caused by *Bacterium tumefaciens* has proved a limiting factor in seedling production in American nurseries.—It is questioned whether prohibition of importation is necessary at the present time, the contention being that all the important diseases and pests of nursery stock have been brought in repeatedly during the long period of free intercourse.

371. **Stone, R. E.**, Incubation period of Cronartium ribicola on the white pine. Phytopath. 8: 438–440. *Fig.* 1. 1918.—In 70 percent of the cases examined the period of incubation could not have been longer than 2 years and 10 months. In the remaining cases the period may have been a year longer.

372. **Tanaka, Tyôzaburô**, Citrus canker in Japan: A translation of the first description of this disease, from the Japanese. Phytopath. 8: 443–444. 1918.—Original article by Kumanosuke, Abe, A new kind of pathogenic microbe: being No. 8 of the organisms injurious to citrus. Nippon no Mikan 37: 162–165. 1904.

373. **Thomas, H. E.**, Cultures of Æcidium tubulosum and A. passifloriicola. Phytopath. 8: 163–164. 1918.—Cultural proof of the connection of *Æcidium tubulosum* Pat. & Gaill. on *Solanum torvum* Sw. with *Puccinia substriata* Ell. & Barth. on *Paspalum paniculatum* and of *Æcidium passifloriicola* P. Henn. on *Passiflora rubra* with *Puccinia scleriæ* (Paz.) Arth. on *Scleria pterota*.

374. **Turner, William F.**, Nezara viridula and kernel spot of pecan. Science 47: 490–491. 1918.—In Georgia, *Nezara viridula* attacks the cow pea by preference but when this host, which is used as a soiling crop in orchards, begins to dry the insects collect on the pecan. A severe infestation of insect in 1916 was coincident with an epiphytotic of kernel spot. The data show that the insect is an important agent either in the production of the disease or a carrier of *Coniothyrium caryogenum* to which Rand has attributed the disease.

375. **Weir, James R.**, Effects of mistletoe on young conifers. Jour. Agric. Res. 12: 715–718.—The paper deals with the early stages of the effect of leafless mistletoes on young conifers. Measurements and photographs are given of young pines infected with *Razoumofskya campylopoda*, and of *Pseudotsuga taxifolia* infected with *R. douglasii*. Both height growth, and for the latter host size of buds, is found to be less in selected infected trees than in vigorous uninfected trees of the same average age. Evidence is presented bearing on storage of food materials in the witches'-brooms resulting from mistletoe attack on pine and larch.—Trees infected when young rarely produce merchantable timber. The killing of old infected trees and the choice of uninfected sites for forest plantations are recommended to insure against infection of young stands.—Carl Hartley.

376. **Weston, William H.**, The downy mildews of maize, their origin and distribution. Jour. Washington Acad. Sci. 8: 43. Jan. 19, 1918.—Abstract of paper read before Botanical Society of Washington, Nov. 6, 1917.

377. **Whetzel, Herbert Hice,** An outline of the history of phytopathology. *130 p., 22 portraits.* W. B. Saunders Co., Philadelphia, 1918.

378. **Worsham, E. Lee,** Twentieth annual report of the State Entomologist for 1917. Georgia State Bd. Ent. Bull. 51: 1–44. 1918.—Cotton anthracnose was reduced by the use of seed selected from disease-free bolls. Treatment of infected seed with mercuric chlorid or sulfuric acid for 1 hour gave no result.—Practical control of angular leaf spot of cotton was secured by using seed two years old and also by treating seed 1 year old with mercuric chlorid or sulfuric acid for 1 hour.—88,000 inspections were made for citrus canker and 7 diseased trees found—The use of a dust mixture containing 90 percent sulfur did not give as good control of bitter rot of apples (Glomerella) as did bordeaux mixture. Varieties Winesap and Gano are susceptible to bitter rot, Yates and Terry Winter are practically immune.—Miscellaneous notes on diseases and insects of peaches, pecans, tomatoes, peppers and other truck crops.

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor.*

[Unsigned abstracts are by the editor.]

BRYOPHYTES

379. **Hurst, C. P.,** East Wiltshire mosses and hepatics. Jour. Bot. 56: 181–186. 1918.—The author gives a list of species with notes; no new species or combinations are published.

ALGAE

380. **Cleland, Ralph E.,** Notes from the Woods Hole Laboratory—1917. II. A new Erythrotrichia from Woods Hole. Rhodora 20: 144–145. *Pl. 124.* 1918. [Edited by F. S. Collins.]—The new species, *E. rhizoidea,* growing on *Porphyra umbilicalis,* is described from Woods Hole Harbor, Massachusetts.

381. **Collins, F. S.,** Notes from the Woods Hole Laboratory—1917. I. Species new to science or to the region. Rhodora 20: 141–143. *Pl. 124.* 1918.—A new species each of *Microchaete* and *Bulbochaete* are described. *Bulbochaete elatior* Prings. and *Mikrosyphar Porphyrae* Kuckuck are reported for the first time from America. *Chroococcus limneticus* Lem. and *Nostoc punctiforme* Hariot ex Bor. & Flah. are recorded as new for the Woods Hole, Massachusetts, region.

382. **Hornby, A. J. W.,** A new British fresh water alga. New Phytol. 17: 41–43. *Fig. 1–4.* 1918.—A new species of Endoderma, *E. Cladophorae,* is described. The alga, occurring principally on Cladophora—rarely on *Rhizoclonium hieroglyphicum,* is at first strictly epiphytic, but later penetrates the lamellae of the host cell wall, resulting in a thallus two or three cells in thickness completely encircling the host filament.

383. **West, G. S.,** A new species of Gongrosira. Jour. Roy Microsc. Soc. 1918: 30–31. *1 pl.* 1918.—*Gongrosira scourfieldii,* a new lime-incrusted species of the genus, is described from Sidmouth, Devonshire.

FUNGI

384. **Arthur, J. C.,** Uredinales of Costa Rica based on collections by E. W. D. Holway. Mycologia 10: 111–154. 1918.—There are listed here 118 rusts. The following are described as new: Uromyces (4 species), Uredo (3 species), Ravenelia (1 species), Puccinia (14 species), Aecidium (3 species). No new genera are proposed.—H. M. Fitzpatrick.

385. **Arthur, J. C.,** Uredinales of the Andes, based on collections by Dr. and Mrs. Rose. Bot. Gaz. 65: 460–474. 1918.—Critical notes on twenty-five species included in nine genera are given. *Puccinia Lagerheimiana* Diet. is transferred to a new genus, Cleptomyces. The telial stages of *Uredo Bambusarum* P. Henn. and *Uredo Mogiphanis* Juel are described and the species transferred to Puccinia. Descriptions of one new species of Uropyxis and one of Sphenospora by G. Lagerheim are included. The author also describes five new species of Puccinia and one of Aecidium.—H. S. JACKSON.

386. **Arthur, J. C.,** New species of Uredineae—X. Bull. Torr. Bot. Club 45: 141–156. 1918.—The author describes eight new species of Puccinia, two of Uromyces, ten of Aecidium, and three of Uredo, all from North America. The telial stages of *Aecidium Atriplicis* Shear and of *Uredo Heliconiae* Diet. are also described and the species transferred to the genera Uromyces and Puccinia respectively.

387. **Arthur, J. C., and G. R. Bisby,** An annotated translation of the part of Schweinitz's two papers giving the rusts of North America. Proc. Amer. Phil. Soc. 57: 173–292. 1918.—An extensive introduction includes a large amount of interesting information concerning the life of Schweinitz, his methods of work, and his herbarium which is now deposited in the rooms of the Academy of Natural Science of Philadelphia. An English translation of the remarks of Schweinitz on the rusts of North America in his two well known papers, is accompanied by many explanatory notes supplied by the authors and based on the critical examination of the specimens as they now exist in the herbarium. These notes are made in the attempt to verify certain of Schweinitz's statements, and to explain doubtful points. A complete list of all the Uredinales described by Schweinitz is given in chronological order. Another list shows the same species arranged according to modern conceptions of classification. Synonyms are cited in most cases. The paper renders available to students of the rusts many facts hitherto unavailable concerning the type specimens of North American Uredinales described by Schweinitz.—H. M. FITZPATRICK.

388. **Arthur, J. C., and J. R. Johnston,** Uredinales of Cuba. Mem. Torr. Bot. Club 17: 97–175. *1 pl.* 1918.—The authors give an extensive historical account of the various rust collections which have been made in Cuba, followed by an enumeration, with notes, of all species (140 in number) which the various collections have thus far brought to light. New species are described of the following genera: Cronartium, 1; Cionothrix, 1; Ravenelia, 1 (on basis of uredinia alone); Puccinia, 3 (the type material of one of these, *P. fuscella*, was issued as No. 772 in Bartholomew's North American Uredinales' under the name *P. Vernoniae*); Aecidium, 2; Uredo, 3; Uromycladium, 1 (doubtfully). The telial stages of *Uredo notata* Arth., *U. Anthephorae* Sydow, *U. Gouaniae* Ellis & Kelsey, and *U. cristata* Speg. are described and the species published respectively under the new combinations and names *Cronartium notatum*, *Puccinia Anthephorae*, *Puccinia invaginata*, and *Uromyces Cupaniae*.

Puccinia macropoda Speg. (*Uredo striolata* Speg.) is published under the new combination *P. striolata*; *Allodus megalospora* Orton appears under the new combination *Puccinia megalospora*; and *P. aequinoctialis* Holw. (*Uredo Adenocalymnatis* P. Henn.) is published under the new combination *P. Adenocalymnatis*. A host index as well as an index to the species of Uredinales is appended.

389. **Atkinson, G. F.,** Six misunderstood species of Amanita. Mem. Torr. Bot. Club 17: 246–252. 1918.—Critical notes on some species which according to the author have been misunderstood in recent American publications on the genus.

390. **Boyce, J. S.,** Perennial mycelium of Gymnosporangium blasdaleanum. Phytopath. 8: 161–162. 1918.—See Entry 289.

391. **Brandes, E. W.,** Anthracnose of lettuce caused by *Marssonina panattoniae*. Jour. Agric. Res. 13: 261–280. *Pl. C and 20.* 1918.—This name is merely a new combination applied by Magnus to the fungus commonly known in America as *Marssonia perforans*. The

name Marssonia is preoccupied by a Phanerogamic genus. The synonomy for this species is given here.—H. M. FITZPATRICK.

392. **Brenckle, J. F.,** North Dakota Fungi—II. Mycologia 10: 199–221. 1918.—This list covers the basidiomycetes and fungi imperfecti. *Hendersonia Crataegi* on *Crataegus mollis* is described as new.—H. M. FITZPATRICK.

393. **Burlingham, Gertrude S.,** New species of Russula from Massachusetts. Mycologia 10: 93–96. 1918.—Four new species are described. These are *R. Davisii*, *R. disparalis*, *R. pulchra*, and *R. perplexa*.—H. M. FITZPATRICK.

394. **Burlingham, Gertrude S.,** A preliminary report on the Russulae of Long Island. Mem. Torr. Bot. Club 17: 301–306. 1918.—A list, with notes, of twenty-two American and fourteen European species of Russula occurring on Long Island, New York.

395. **Burt, E. A.,** Corticiums causing Pellicularia disease of the coffee plant, Hypochnose of pomaceous fruits, and Rhizoctonia disease. Ann. Missouri Bot. Gard. 5: 119–132. *Fig. 1–3.* 1918.—The description of *Corticium koleroga* (Cooke) v. Höhn. is slightly broadened on the basis of specimens now known from widely separated regions. *Hypochnus ochroleucus* Noack is transferred to Corticium and published under the name *C. Stevensii*. Descriptions, synonomy, distribution, and critical notes are given for both species as well as for *C. vagum* Berk. & Curtis.

396. **Carpenter, C. W.,** Wilt diseases of okra and the Verticillium wilt problem. Jour. Agric. Res. 12: 529–546. *Pl. A and 17–27.* 1918.—A comparative study of *Verticillium albo-atrum* in moist and dry air demonstrates that the type of conidium formation is not a sound basis for separation of the genera *Verticillium* and *Acrostalagmus*. The conidia of this species in moist air are held together in a spherical head of hygroscopic slime, as described for species of *Acrostalagmus*. Attention is called to the earlier work of Reinke and Berthold, recently generally overlooked, in which *Acrostalagmus* Corda is united with the older genus *Verticillium* Nees. Cross inoculations show that *Verticillium albo-atrum* causes a wilt disease of okra, snapdragon, eggplant, potato, cotton, *Xanthium spp.*, and *Abutilon spp.* The suggestion is made that *Acrostalagmus albus*, *A. panax*, *A. caulophagus*, *A. vilmorinii*, and *V. dahliae* are all probably identical with *V. albo-atrum*, since in culture these fungi are not to be distinguished.—H. M. FITZPATRICK.

397. **Coker, W. C.,** The Lactarias of North Carolina. Proc. Elisha Mitchell Sci. Soc. 34: 1–61. *Pl. 1–40.* 1918.—Fifty species and forms of Lactaria are listed, accompanied by descriptions and copious notes, and, in most cases, by full-page half-tone reproductions of photographs made by the author. Seven new species and a new form ("Form A") of each of three previously recognized species are described. A key to species is given.

398. **Davis, J. J.,** Tilletia on wheat in North Dakota. Phytopath. 8: 247. 1918.—Brenckle's Fungi Dakotenses No. 132 labeled *Tilletia tritici* is here stated to be *T. laevis*.—H. M. FITZPATRICK.

399. **Dodge, B. O.,** Studies in the genus Gymnosporangium—II. Report on cultures made in 1915 and 1916. Bull. Torr. Bot. Club 45: 287–300. *Pl. 8.* 1918.—Inoculations with *Gymnosporangium clavipes*, *G. macropus*, *G. globosum*, *G. Ellisii*, *G. clavariaeforme*, *G. juvenescens*, *G. nidus-avis*, *G. transformans*, and *G. fraternum* are discussed and the results tabulated.—H. M. FITZPATRICK.

400. **Dodge, B. O., and J. F. Adams,** Some observations on the development of Peridermium cerebrum. Mem. Torr. Bot. Club 17: 253–261. *Pl. 4–6. f. 1–3.* 1918.

401. **Douglas, Gertrude E.**, The development of some exogenous species of Agarics. Amer. Jour. Bot. 5: 36–54. *Pl. 1–7.* 1918.—*Mycena subalkalina* Atkinson, occurring on decaying wood in the vicinity of Ithaca, New York, is incidentally described as a new species.—See Entry 65.

402. **Enlows, Ella M. A.**, A leafblight of Kalmia latifolia. Jour. Agric. Res. 13: 199–212. *Pl. 14–17.* 1918.—The pycnidial stage of the causal organism is described under the name *Phomopsis Kalmiae* n. sp. The attempts to find an ascigerous stage were unsuccessful.—H. M. FITZPATRICK.

403. **Fairman, Charles E.**, Notes on new species of fungi from various localities—II. Mycologia 10: 164–167. 1918.—The following new species are described: *Phoma verbascicarpa* on *Verbascum Blattaria*, *Phomopsis ericaceana* on *Azalea mollis*, *Sphaeropsis wistariana* on *Wistaria* (cult.), *Sphaeropsis Diervillae* on *Diervilla Diervilla*, *Camarosporium wistarianum* on *Wistaria* (cult.), *Rhabdospora translucens* on *Tecoma radicans* *Microdiplodia Diervillae* on *Diervilla Diervilla*, *Hendersonia hortilecta* on *Clematis paniculata*, *Dictyochora Gambellii* on *Zea mays*, *Platystomum phyllogenum* on *Anastraphia Northrupiana*. The last named species was collected in Cuba, the others in New York.—H. M. FITZPATRICK.

404. **Faulwetter, R. C.**, The Alternaria leaf-spot of cotton. Phytopath. 8: 98–105. *Fig. 1–3.* 1918.—*Alternaria tenuis* Nees or a closely related species. See Entry 96.—H. M. FITZPATRICK.

405. **Fitzpatrick, Harry M.**, The life history and parasitism of *Eocronartium muscicola.* Phytopath. 8: 197–218. *Pl. 1, f. 1–7.* 1918.—*Typhula muscicola Fr.*, *Clavaria muscigena Karsten*, and *Eocronartium typhuloides* Atkinson are shown to be identical. The fungus takes, therefore, the older specific name *muscicola*. *Clavaria uncialis* Grev. is found not to be identical with *Clavaria muscigena* as believed by Karsten. All the known hosts of *Eocronartium muscicola* are listed. A review is given of what is known of the parasitic Auriculariaceae. See Entry 306.—H. M. FITZPATRICK.

406. **Godfrey, G. H.**, Sclerotium rolfsii on wheat. Phytopath. 8: 64–66. *Fig. 1.* 1918.

407. **Graff, P. W.**, Philippine micromycetous fungi. Mem. Torr. Bot. Club 17: 56–73. 1918.—The author describes one new species each of Ascophanus, Meliola, Phyllosticta, and Actinothyrium. In addition, fifty-two previously recognised species are listed with notes and principal synonomy. All the species reported are from the island of Luzon.

408. **Harper, Ed. T.**, The Clavaria fistulosa group. Mycologia 10: 53–57. *Pl. 3–5.* 1918.—The following species are figured and discussed: *C. ardenia*, *C. fistulosa*, *C. macrorrhiza*, *C. contorta*, *C. juncea*.—H. M. FITZPATRICK.

409. **Harter, L. L.**, A hitherto-unreported disease of okra. Jour. Agric. Res. 14: 207–212. *Pl. 23.* 1918.—The causal organism occurs on the stems and pods, and has been found on plants in Maryland and New York. It is here named *Ascochyta abelmoschi* n. sp., on account of its production of a large percentage of 1-septate spores. The examination of type material of *Phoma okra* Cke., and of two other collections of this species made by Langlois showed no septate spores.—H. M. FITZPATRICK.

410. **Hedgcock, Geo. G., E. Bethel and N. Rex Hunt**, Notes on some western Uredineae. Phytopath. 8: 73–74. 1918.—The spermagonia of *Peridermium pyriforme* and *P. filamentosum* are borne on the bark of the host in newly invaded areas one year preceding the appearance of the aecidia. *Peridermium filamentosum* and *P. harknessi* are regarded as probably distinct species although they both have their uredo and teleuto stages on *Castilleja* (*Cronartium coleosporoides*).—H. M. FITZPATRICK.

411. **Hedgcock, Geo. G., and N. Rex Hunt,** Notes on Cronartium cerebrum. Phytopath. 8: 74. 1918.—Inoculations made with pedigree cultures indicate that the fungus which forms the fusiform type of gall (*Peridermium fusiforme* Arth. & Kern) is distinct either racially or specifically from that forming the sphaeroid gall (*P. cerebrum* Peck).—H. M. FITZPATRICK.

412. **Hoffer, Geo. N.,** An aecium on red clover, Trifolium pratense L. Proc. Indiana Acad. Sci. 1916: 325–326. 1917.—The author records the occurrence at Lafayette, Indiana, of the aecial stage of *Uromyces* (*Nigredo*) *fallens* (Desm.) Kern.—H. S. JACKSON.

413. **Hopkins, E. F.,** The disease of tulips caused by Botrytis parasitica. Phytopath. 8: 75. 1918.

414. **Jackson, H. S.,** Carduaceous species of Puccinia, I. Species occurring on the tribe Vernoniae. Bot. Gaz. 65: 289–312. 1918.—Descriptions or critical notes of 29 species of Puccinia from all parts of the world occurring on the host genera Vernonia, Elephantopus and Piptocarpha are given. Nine new species are described on Vernonia six of which were collected in Guatemala or Costa Rica and are described jointly with the collector E. W. D. Holway. The others are from Jamaica, Ceylon, and Bolivia. *Endophyllum Vernoniae* Arth. and *Argomyces Vernoniae* Arth. are transferred to Puccinia and new names proposed. *Argomyces insulanus* Arth. is also transferred to Puccinia.—H. S. JACKSON.

415. **Jagger, I. C., and V. B. Stewart,** Some Verticillium diseases. Phytopath. 8: 75. 1918.—See detailed account in: Phytopath. 8: 15–19. 1918.—H. M. FITZPATRICK.

416. **Jagger, I. C., and V. B. Stewart,** Some Verticillium diseases. Phytopath. 8: 15–19. 1918.—See Entry 109.

417. **Johnston, John R., and Stephen C. Bruner,** A Phyllachora of the royal palm. Mycologia 10: 43–44. *Pl. 2.* 1918.—*Phyllachora Roystoneae* n. sp.—H. M. FITZPATRICK.

418. **Jones, Fred Reuel,** Yellow-leafblotch of alfalfa caused by the fungus Pyrenopeziza medicaginis. Jour. Agric. Res. 13: 307–330. *Pl. D, 25, and 26.* 1918.—*Sporonema phacidioides* Desm. is shown to be the conidial stage of this fungus, rather than that of *Pseudopeziza medicaginis*. A complete synonomy is given.—H. M. FITZPATRICK.

419. **Keitt, G. W.,** Inoculation experiments with species of Coccomyces from stone fruits. Jour. Agric. Res. 13: 539–570. *Pl. 55–59. f. 1–3.* 1918.—A preliminary paper recording the results of over one thousand cross inoculations with *Coccomyces spp.* isolated from common species of Prunus. No attempt is made to summarize the results bearing on the limits of the species of Coccomyces used, but a paper which is to follow will do so.—H. M. FITZPATRICK.

420. **Lehman, S. G.,** Conidial formation in *Sphaeronema fimbriatum*. Mycologia 10: 155–163. *Pl. 7.* 1918.—*Sphaeronema fimbriatum*, the fungus causing a black-rot disease of the sweet potato, has two types of conidia termed "hyaline conidia" and "olive conidia." The olive conidia are here stated to be produced exogenously. The hyaline conidia resemble the endoconidia of Thielavia as described by Brierley in certain respects but differ in others. While the first two conidia are regarded as endoconidia those produced subsequently are said to be exogenously produced.—H. M. FITZPATRICK.

421. **Levine, M.,** The physiological properties of two species of poisonous mushrooms. Mem. Torr. Bot. Club 17: 176–201. *Pl. 1–2.* 1918.—Photographic reproductions of *Paneaeolus venenosus* Murrill and *P. retirugus* Fr. are given.

422. **Levine, M. N., and E. C. Stakman,** A third biologic form of Puccinia graminis on wheat. Jour. Agric. Res. 13: 651–654. 1918.—Stemrust collected on volunteer wheat at Stillwater, Oklahoma, is found to differ parasitically from *Puccinia graminis tritici* and *P. graminis tritici-compacti*. A new trinomial is not proposed.—H. M. FITZPATRICK.

423. **Long, W. H.,** An undescribed canker of poplars and willows caused by Cytospora chrysosperma. Jour. Agric. Res. 13: 331-345. *Pl. 27-28.* 1918.

424. **Long, W. H., and R. M. Harsch,** Aecial stage of Puccinia Oxalidis. Bot. Gaz. 65: 475-478. 1918.—Field observations and culture experiments supporting the conclusion that a previously undescribed *Aecidium* having unusual morphological characters which occurs on *Berberis repens* in New Mexico is the aecial stage of *Puccinia Oxalidis* (Lev.) Diet. & Peck. A description of all stages of the species is given.—H. S. JACKSON.

425. **Martin, George W.,** Brown blotch of the Kieffer pear. Phytopath. 8: 234-238. *f. 1-8.* 1918.—The fungus causing the disease is believed to be closely related to *Leptothyrium pomi*, or to be a variety of that organism. See Entry 330.—H. M. FITZPATRICK.

426. **Melchers, L. E.,** Botrytis sp. causing severe injury to flowers and foliage of Pelargonium hortorum. Phytopath 8: 76. 1918.—A species said to be closely related to, if not identical with, *Botrytis cinerea*, causing a disease of geranium.—H. M. FITZPATRICK.

427. **Melchers, Leo E., and John H. Parker,** Another strain of Puccinia graminis. Kansas Agric. Exp. Sta. Circ. 68: 1918.—Stemrust collected on wheat in the field at St. Paul, Minn., is found to represent a third biologic form of *P. graminis* on wheat. It is able to infect varieties of hard winter wheat which are highly resistant to the two biologic forms previously described. The name *P. graminis tritici-inficiens* is applied.—H. M. FITZPATRICK.

428. **Murrill, William A.,** Illustrations of fungi—XXIX. Mycologia 10: 177-181. *Pl. 8.* 1918.—*Mycena viscidipes, Laccaria amethystea, Leptonia conica, Laccaria striatula, Mycena galericulata, Omphalia fibula, Clitocybe farinacea, Marasmius dichrous,* and *M. institius* described and illustrated in colors.—H. M. FITZPATRICK.

429. **Murrill, W. A.,** Illustrations of fungi—XXVIII. Mycologia 10: 107-110. *Pl. 6.* 1918.—*Trametes cinnabarina, Polystictus conchifer, Polyporus brumalis, Polyporus adustus, Polyporus amorphus,* and *Daedalea unicolor* described and figured in colors.—H. M. FITZPATRICK.

430. **Murrill, William A.,** The Agaricaceae of tropical North America—VII. Mycologia 10: 15-33. 1918.

431. **Murrill, W. A.,** The Agaricaceae of tropical North America—VIII. Mycologia 10: 62-85. 1918.

432. **Murrill, W. A.,** Collecting fungi at Delaware Water Gap. Mem. Torr. Bot. Club 17: 48-51. 1918.—A list, including 182 species of Ascomycetes, Uredinales, Hymenomycetes, and Gasteromycetes, of fungi collected in 1917 in the region about Delaware Water Gap, Pennsylvania.

433. **Osner, George A.,** Stemphylium leafspot of cucumbers. Jour. Agric. Res. 13: 295-306. *Pl. 21-24.* 1918.—*Stemphylium cucurbitacearum* n. sp.—H. M. FITZPATRICK.

434. **Petch, T.,** Fungus diseases of food crops in Ceylon. Trop. Agriculturist 50; 159-163. 1918.—The principal fungus and bacterial parasites of important agricultural plants are listed.

435. **Potter, Alden A., and G. W. Coons,** Differences between the species of Tilletia on wheat. Phytopath. 8: 106-113. *f. 1-4.* 1918.—See Entry 133.

436. **Pratt, O. A.,** Soil fungi in relation to diseases of the Irish potato in southern Idaho. Jour. Agric. Res. 13: 73-100. *Pl. A and B.* 1918.—Nearly seventy different species or strains of fungi isolated from the soil are listed. Detailed descriptions of five new species of Fusarium are included.—H. M. FITZPATRICK.

437. Rhodes, Arthur S., Some new or little known hosts for wood-destroying fungi. II. Phytopath. 8: 164–167. 1918.—See Entry 354.

438. Rhodes, Arthur S., George G. Hedgcock, Ellsworth Bethel and Carl Hartley. Host relationships of North American rusts, other than gymnosporangiums, which attack conifers. Phytopath. 8: 309–352. 1918.—The North American species of Cronartium, Coleosporium, Gallowaya, Melampsora, Pucciniastrum, Melampsoridium, Melampsorella, Calyptospora, Necium, Uredinopsis, Melampsoropsis, and Chrysomyxa, and the unattached species of the form genera Peridermium, Caeoma, and Uredo which attack conifers are treated.—See Entry 355.—H. M. Fitzpatrick.

439. Roberts, John W., Plum blotch. Phytopath. 8: 74. 1918.—*Phyllosticta congesta* on Japanese varieties in Georgia.—H. M. Fitzpatrick.

440. Seaver, Fred. J., Photographs and descriptions of cup-fungi—VII. The genus Underwoodia. Mycologia 10: 1–3. *Pl. 1.* 1918.—Material of *Underwoodia columnaris* collected at Hudson Falls, N. Y., is figured and described.—H. M. Fitzpatrick.

441. Stakman, E. C., and G. R. Hoerner, Puccinia graminis tritici compacti in southern United States. Phytopath. 8: 77. 1918.—A short abstract. See more detailed account in Phytopath. 8: 141–149. 1918. See Entry 442.—H. M. Fitzpatrick.

442. Stakman, E. C., and G. R. Hoerner, The occurrence of Puccinia graminis tritici-compacti in the southern United States. Phytopath. 8: 141–149. 1918.—The discovery of this rust on different hosts in widely separated localities indicates that it is not merely a local variant form of *P. graminis tritici*. See Entry 441.—H. M. Fitzpatrick.

443. Standley, Paul C., Rusts and smuts collected in New Mexico in 1916. Mycologia 10: 34–42. 1918.

444. Stone, R. E., Orange rust of Rubus in Canada. Phytopath. 8: 27–29. *f. 1.* 1918.—Spores of the orange rust, from both blackberries and raspberries collected in Ontario, and sown on wet slides produced typical germ tubes with no signs of promycelial formation. Later in the season the 2-celled stalked teleutospores were collected from the same plants.—H. M. Fitzpatrick.

445. Tanaka, Tyôzaburô, New Japanese Fungi. Notes and translations—IV. Mycologia 10: 86–92. 1918.—*Botrytis liliorum* Y. Fujikuro on *Lilium longiflorum* Thumb., *Phyllosticta* (*Phoma*) *Kuwacola* K. Hara on leaves, shoots, and twigs of *Morus alba*, *Septobasidium acaciae* Sawada on *Acacia Richii*, *Cercospora pini-densiflorae* Hori et Nambu on needles of *Pinus densiflora*, *Helicobasidium Tanakae* Miyabe ex K. Sawada on *Morus*, *Vitis*, *Salix*, and other hosts in a considerable number of genera, *Nothopatella moricola* I. Miyake on *Morus alba*, *Ustulina Mori* K. Hara on *Morus alba*, and *Valsa Paulowniae* Miyabe et Hemmi.—H. M. Fitzpatrick.

446. Taubenhaus, J. J., Pot or pit (soilrot) of the sweet potato. Jour. Agric. Res. 13: 437–450. *Pl. 51–52.* 1918.—A new species of Actinomyces isolated from sweet potato is named *A. poolensis*. It is apparently a wound parasite, and follows invasion by *Cystospora batata*, the parasitic slime mould described by Elliott. It is also pointed out here that *Acrocystis batatas* E. and Hals. is evidently identical with *Cystospora batata*; and the genus Acrocystis is stated to be invalid.—H. M. Fitzpatrick.

MYXOMYCETES

447. Taubenhaus, J. J., Pot or pit (soilrot) of the sweet potato. Jour. Agric. Res. 13: 437–450. *Pl. 51–52.* 1918.—See Entry 446.

448. Thomas, H. E., Cultures of Aecidium tubulosum and A. passifloriicola. Phytopath. 8: 163–164. 1918.—See Entry 373.

449. Weir, James R., Notes on the altitudinal range of forest fungi. Mycologia 10: 4–14. 1918.—See Entry 13.

450. Weir, James R., and Ernest E. Hubert, Cultures with Melampsorae on Populus. Mycologia 10: 194–198. 1918.—It is shown that the two rusts heretofore distinguished as *Melampsora medusae* and *M. albertensis* will each infect both Pseudotsuga and Larix, and in the absence of sharp differential morphological characters they are regarded as identical, i.e., *M. medusae*. *Larix lyalli* and *Pseudotsuga macrocarpa* are given as new hosts for this species.—H. M. Fitzpatrick.

451. Weir, James R., and Ernest E. Hubert, Cronartium coleosporioides on Pedicularis groenlandica. Phytopath. 8: 63. 1918.—See Entry 152.

452. Weir, James R., and Ernest E. Hubert, A note on Hyalopsorae. Phytopath. 8: 37–38. 1918.—See Entry 150.

453. Weir, James R., and Ernest E. Hubert, Notes on forest tree rusts. Phytopath. 8: 114–118. 1918.—See Entry 153.

454. Whetzel, H. H., The Botrytis blight of golden seal. Phytopath. 8: 75–76. 1918.—The host is *Hydrastis canadensis*. The fungus is a member of the sub-division Microsclerotiae of the genus Botrytis, and has been found on diseased plants in Wisconsin, Michigan and New York.—H. M. Fitzpatrick.

455. Wilson, Guy West., Rusts of Hamilton and Marion counties, Indiana II. Proc. Indiana Acad. Sci. 1916: 382–383. 1917.—Includes notes on five species of Uredinales, three of which are previously unrecorded from the area covered. (Supplementary to Wilson, G. W., Rusts of Hamilton and Marion counties, Indiana. Proc. Indiana Acad. Sci. 1905: 177–182. 1906).—H. S. Jackson.

456. Wilson, Guy West, Studies in North American Peronosporales—VII. New and noteworthy species. Mycologia 10: 168–169. 1918.—*Peronospora grisea* Unger found near Carmel, Indiana, on *Veronica arvensis* and *V. peregrina*; *Peronospora Seymourii* Burrill collected on *Houstonia minor* at Iowa City, Iowa, believed to be the third collection; *Rhysotheca (Plasmopara) Acalyphae* sp. nov. on *Acalypha virginica* at Madison, Wisconsin by J. T. Davis.—H. M. Fitzpatrick.

457. Wolf, Frederick A., and E. E. Stanford, A Macrophoma disease of figs. Phytopath. 8: 24–27. *Fig. 1–2.* 1918.—The organism is believed to be identical with *Macrophoma Fici* Alm. & S. Cam. Material from North Carolina is compared with collections from Texas and Africa. The conidia are extremely variable in size and form, and are not infrequently 1–2-septate.—H. M. Fitzpatrick.

458. Zeller, Sanford M., An interesting fungus from Friday Harbor, Washington. Pub. Puget Sound Biol. Sta. 2: 95–96. 1918.—Locality and description of *Rhizopogon diplophloeus* Zeller & Dodge.—T. C. Frye.

459. Zeller, S. M., and C. W. Dodge, Gautieria in North America. Ann. Missouri Bot. Gard. 5: 133–142. *Pl. 9.* 1918.—The authors give a list, with key, of species (five in number) of the genus known to occur in North America; descriptions, synonomy, references to illustrations, information as to distribution, and critical notes accompany the species. *Gautieria villosa* Quelet is placed in synonomy under *G. morchelliformis* Vittadini. *G. plumbea* is described as new. *Chamonixia caespitosa* Rolland is included under the extra-limital and

doubtful species, and while the authors suspect that the species belongs to Gautieria they do not make the transfer; under the same heading critical notes are given for two additional species of Gautieria.

460. Zimm, L. A., A wilt disease of maples. Phytopath. 8: 80–81. 1918.—A species of Verticillium.—H. M. Fitzpatrick.

Vol. I NOVEMBER, 1918 No. 3

ENTRIES 461-813

BOTANICAL ABSTRACTS

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for the remainder of volume 1 and also for the first issue of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Other changes will be reserved till the end of the present volume. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief.

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Vol. I — NOVEMBER, 1918 — No. 3

ENTRIES 461–813

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

[Unsigned abstracts are by the editor.]

461. [ANON.] **The reconstruction of elementary botanical teaching. The examination of a witness.** New Phytol. 17: 3–8. 1918.—This and three following communications are discussions of a memorandum under the same general title published by F. F. Blackman, V. H. Blackman, Frederick Keeble, F. W. Oliver, and A. G. Tansley, during the previous month (*New Phytol.* 16: 241–252. 1917.) The anonymous "witness" casts his discussion in the form of an examination by the five authors of the memorandum. He believes that the study of comparative morphology may be made to awaken the student's interest and stimulate his reasoning powers and imagination, and that it provides a solid foundation for work in physiology and applied botany; that ecology cannot profitably be included, except in the most general way, in an elementary course. Rigidity is to be avoided, and a teacher's own interests may suggest the lines on which his teaching may be made inspiring.—*Hazen.*

462. HILL, T. G. [Same general title as Entry 461.] **Some practical suggestions.** New Phytol. 17: 9–12. 1918. The grouping of other subjects to be studied with botany is discussed. The staff of each department of botany should include a chemist and a physicist. The student in physiology should be taught in such a way as to understand and be able to devise apparatus for particular experiments. Practical examinations are advocated.—*Hazen.*

463. JEFFREYS, HAROLD. [Same general title as preceding.] **Ecology as a subject for teaching.** New Phytol. 17: 51–53. 1918. This letter deprecates the inclusion of ecology in an elementary course, on the grounds that ecological research has not advanced sufficiently far to give the subject disciplinary value, and that the descriptive or informational part cannot profitably be studied without extensive preliminary field training, involving at least two summers. An editorial note (by A. G. Tansley) disclaims any intention of the Memorandum to include ecology "as a set subject in an elementary course," but maintains that ecology contributes essential material for the presentation of the conception of plants as living organisms.—*Hazen.*

464. McLEAN, R. C. [Same general title as Entry 461.] **A plea for freedom.** New Phytol. 17: 54–56. 1918. The writer objects to the Memorandum as revolutionary and oppressive, and maintains the opinion that students may be more easily interested in morphology than in physiology.—*Hazen.*

465. Bigelow, Maurice H. **Contributions of zoology to human welfare.** Science 48: 1-5. July, 1918. Emphasizes contributions to human welfare which biology may make through an education aiming to extend scientific knowledge to everybody, as contrasted with contributions through research and application of knowledge to physical human welfare; includes contributions to (1) intellectual life, and (2) eugenics. Author believes that no phase of biology which has purely physical applications to human welfare, such as bacteria and disease, or biology applied to agriculture, is more important for the *average* educated citizen than a general understanding of the evolutionary theory; hence he urges that our conception of applied biology for general education must be large enough to include intellectual as well as more directly practical aspects which affect human welfare economically and hygienically. Applied biology should be understood in a broad sense as meaning a selection, from the vast field of biological learning, of those facts and ideas which are likely to mean most in the life of the average educated man or woman. He urges an educational movement for eugenics based on a knowledge of biology, not through schools and colleges only, but through lectures, magazines, newspapers, and posters.

466. Kirkwood, J. E. **The practical in education.** Reprint from Inter-Mountain Educator. Jan., 1918. Paper read before Higher Education Section, Montana State Teachers' Assoc. Our most practical subjects are not always those most obviously applicable to economic problems, but those which pertain to the outlook upon life, and cultivate a truer perspective and a better sense of relative values. Illustrations from the field of botany.

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*

467. Conard, H. S. **Tree growth in the vicinity of Grinnell, Iowa.** Jour. Forestry 16: 100-106. Jan., 1918.—In presenting data upon tree growth in the vicinity of Grinnell, Iowa, several facts are brought out in addition to noting the average annual growth increments of several species. There seems to be conclusive evidence that trees are encroaching upon the grasslands, and this is ascribed to the elimination of prairie fires during the past half-century. While this accounts for the present increase of forested areas it is not regarded as explaining the presence of grasslands, which constituted the natural vegetation upon the best soils in the region. The richer soils are very favorable to tree growth and the growth increments are sufficiently large to indicate that timber would prove a profitable crop. Some typical average annual increments are *Carya ovata*, 0.22 inch; *Quercus macrocarpa*, 0.30 inch; *Q. velutina*, 0.29 inch; *Acer saccharinum*, 0.63 inch and *Juglans nigra*, 0.34 inch. [Rev. by Fuller in Bot. Gaz. 66: 542-543. 1918.]—*Geo. D. Fuller.*

468. Evans, I. B. Pole. **The plant geography of South Africa.** Dept. Agric. Union of South Africa. Official Year Book. 1917. 8 p. *24 pls. 1 map.* 1918.—The very diverse vegetational types of South Africa are classified and mapped, in such a manner as to give an idea of the ecological divisions of the southern part of that continent. The woodland is subdivided into *forest, scrub, bushveld* and *palmveld.* The first of these, which is mostly evergreen,is dominated by species of *Podocarpus*, while the scrub is a type of sclerophyllous shrub, in which the *Proteaceae, Ericaceae* and *Restionaceae* contribute the dominant forms. From this the bushveld differs in its deciduous character and also in its more park-like aspect and its floristic composition. Bushveld is widely distributed and, while dominated by *Acacia* spp., such genera as *Tamarix, Combretum, Ficus, Zizyphus* and *Rhus* are of common occurrence. The palm belt comprises a littoral strip on the southeast, in which palms (as *Mimusops caffra* and *Phoenix reclinata, Raphia vinifera* and *Cocos nucifera*) mingle with succulents from the genera *Aloe* and *Euphorbia.*—The grasslands cover the larger portion of the country, with transitions to scrub and desert. That of the Kalahari region occupies much of the central portion of South Africa, with an open formation of short, low, wiry grasses (such as *Aristida* and *Eragrostis*), occurring in isolated tufts. This and the other grasslands show

transitions to the desert towards the west.—Four distinct desert types are briefly characterized and mapped, perhaps the most remarkable being the southern portion, the vast shallow basin of the Karroo, sparsely populated by succulent, tuberous and bulbous plants. Prominent genera are *Crassula, Mesembryanthemum, Cotyledon, Euphorbia, Aloe, Stapelia, Senecio, Encephalartos* and *Euclea*. The paper contains excellent plates which enable one to visualize the different types, and a map showing their distribution. [Rev. by Shreve in Plant World 21: 160. 1918. Also rev. by Fuller in Bot. Gaz. 66: 539. 1918. Also unsigned rev. in Nature 101: 509. 1918.]—*Geo. D. Fuller.*

469. FERNALD, M. L. **The contrast in the floras of eastern and western Newfoundland.** Amer. Jour. Bot. 5:237–247. *3 pls.* May, 1918.—In contrasting the divergent floras of different parts of Newfoundland, Fernald bases his explanation of their differences upon the hypothesis that "the presence or absence of varying degrees of available lime or of other bases in the soil is more fundamental in determining plant distribution than are even considerable differences of temperature and humidity."—The most calcareous and at the same time the most fertile portion of the island is along the west shore, where the ordinary observer would be surprised to find the indigenous flora of the warmest and most mesophytic region of the island, composed very largely of species of far northern distribution, such as *Juncus triglumis, Saxifraga oppositifolia, S. aizoides, S. caespitosa, Salix vestita, Dryas integrifolia* and *Lesquerella arctica*. These Fernald explains as being from the calcareous habitats of the arctic archipelago and the Canadian Rockies, the lime being hostile to the plants of the adjacent siliceous mainland.—The eastern part of the island, the central tundra district, and the southwest corner, in spite of the fact that these regions are cold, bleak and barren, are populated mainly by plants of the southern Atlantic coast region, with an addition of some like *Calluna vulgaris* and *Pedicularis sylvatica*, from the acid soils of western Europe.—Maps of the distribution of a dozen species give graphic demonstration of the remarkable distribution of some of the more important plants. [Rev. by Fuller in Bot. Gaz. 67: 101. 1919.]—*Geo. D. Fuller.*

470. HESSELBO, AUG. **The Bryophyta of Iceland.** *In*: ROSENVINGE, L. K., and EUG. WARMING. **The botany of Iceland.** 1[2]: 397–676. *39 fig.* 1918.—This is a rather complete account of the bryophytes of the island of Iceland. His annotated list shows 93 species of Hepaticae, 20 of Sphagnales and 325 of Musci. These he further discusses as to their aggregation in communities and their altitudinal and horizontal distribution. [Full rev. by A. Gepp in Jour. Bot. 56: 277–279. 1918. Unsigned rev. in Nature 102: 44–45. 1918. Abst. by Fuller in Bot. Gaz. 67: 104. 1919.]—*Geo. D. Fuller.*

471. HOWE, C. D. **Forest regeneration on certain cut-over pulpwood lands in Quebec.** Commis. Conservation Canada, Ann. Rep. 9: 1–15. 1918.—The problems of the regeneration of certain pulpwood forests are discussed. Author finds that, under the usual conditions of cutting, the mixed conifer and hardwood forests of the lower St. Maurice valley are replaced by pure hardwood stands of little value for pulpwood. He deplores the lack of experimental data for the establishment of a system of management which would result in the increased production of the valuable spruce. [Abst. in Exp. Sta. Rec. 39: 145. 1918.]—*Geo. D. Fuller.*

472. OSTRUP, ERNST. **Marine diatoms from the coasts of Iceland.** *In*: ROSENVINGE, L. K., and EUG. WARMING, **The botany of Iceland.** 1[2]: 347–394. *Pl. 1.* Copenhagen, 1918.—As a contribution to the botany of Iceland are listed 209 species of marine diatoms collected off the coasts of the island. Of these, about 5 represent new species. Tabular arrangements show distribution, both near the Iceland coast and elsewhere. It is shown that this portion of the coastal flora has strong European affinities. Tables also show the forms characteristically associated with other marine algae and the forms characteristic of different months of the year.—*Geo. D. Fuller.*

473. SKOTTSBERG, CARL. **The islands of Juan Fernandez.** Geog. Rev. 5:362–383. *20 fig.* May, 1918.—This paper gives an account of a visit to the islands of Juan Fernandez to study

their peculiar flora. Technical report is promised as soon as material collected has been worked over; in the meantime attention is called to the large number of endemic species; mention is made of *Lactoris fernandeziana*, a relative of the magnolias, constituting a monotypic endemic family. Also, the general character of the forest is sketched; it is of the evergreen rain-forest type, similar to that of southern Chile, and contains some Chilean species although dominated by endemics, among which species of *Myrceugenia* and the monotypic palm, *Juanita australis*, are conspicuous. Ferns are abundant, ranging from the large tree type to the minute *Hymenophylla.*—The endemics mentioned include many miniature tree forms belonging to the composite family, and *Gunnera Mas-afuerae*, with leaves ten feet across. [Rev. in Plant World 21: 161–162. 1918.]—*Geo. D. Fuller.*

GENETICS

Geo. H. Shull, *Editor*

[Unsigned abstracts are by the editor.]

474. Andô, H. **Oomugi no iden ni kwansuru kenkyû. [Studies on inheritance in barley.]** [In Japanese.] Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.] 2^2: 1–7. May, 1918.—Following observations are based on individuals derived from natural cross of Canadian race of two-ranked barley with hulled grains loosely arranged on spike. Author found as usual that two-ranked arrangement is dominant to six-ranked. In F_2 the ratio of the two kinds of individuals is 2.5 to 1 (4.3 : 1 according to Tschermak, and 3 : 1 according to Biffen). Author thinks that this ratio is not mere chance deviation from 3 : 1; he assumes one factor C, common to both, for development of the six-ranked arrangement, and two factors H_1 and H_2, which, acting together in presence of C, inhibit development of side-rows of the spike, thus causing formation of two-ranked arrangement. He further supposes coupling of H_1 and H_2 according to gametic series 13:1:1:13, and thus explains above-stated ratio, 2.5 : 1. In plants derived from cross in question some have hulled, and others naked grains; again, in some they are loosely arranged on spike, while in others very compactly, hulled condition and loose arrangement being dominant to naked and compact ones, respectively. In F_2 of these dihybrids author did not find usual 9 : 3 : 3 : 1 ratio, but quite another 134 : 13 : 13 : 36. He explains this unusual ratio by supposing that factor A for hulled grains and L for loose arrangement are coupled together according to gametic series 6 : 1 : 1 : 6. Cross of two-ranked barley by six-ranked gave F_1 plants varying notably in respect to shape of side rows.—*S. Ikeno.*

475. Cole, Leon J. **The application of genetics to breeding problems.** School Sci. Math. 18: 447–454. *6 fig.* May, 1918.—Science of breeding must consist of (1) analysis of hereditary factors involved and (2) manipulation of these in breeding to produce combinations which will give results as expressed in characters. Selection is basis on which all progress in breeding must be made, based on knowledge of factors in materials used. Deleterious effects of inbreeding explainable by theory of "vital" factors whose absence has "lethal" effect. By far greatest number of characters of commercial importance dependent on several to many factors. Such characters must be analyzed, their constituent factors identified and their mode of inheritance determined. Examples, milk and meat production in cattle and immunity to disease.—*E. E. Barker.*

476. Cutler, D. W. **On the sterility of hybrids between the pheasant and the gold campine fowl.** Jour. Genetics 7: 155–165. *1 pl.* May, 1918.—Spermatogenesis proceeds normally until synapsis, and stops here with formation of irregular chromatin masses. No females appeared, though a dozen males were secured. Possibility of pheasant spermatozoa forcing female-producing class of eggs to give rise to males is raised.—*H. D. Goodale.*

477. De Vries, Hugo. **Van Amoebe tot Mensch. From amoeba to man.** *17 × 25 cm. 32 p.* A. Oosthoek, Utrecht, 1918.—In this last lecture of De Vries at University of Amster-

dam, (delivered in Dutch and published in Dutch with complete English translation), he reviews briefly some lines of investigation on heredity and origin of species, emphasizing pangenesis conception of Darwin and himself, which asserts heredity is bound to material particles (gemmules or pangenes) actually transmitted in reproduction. Pangenes are located in chromosomes in definite arrangement as recently determined in Drosophila. Changing influence of these genes under changing environments gives fluctuating variability; appearance of new genes and inactivation or loss of existent genes gives mutational variability, one of main sources of new species and of progressive differentiation in time. Reversions give idea of active and inactive pangenes, latter not necessarily lost as Bateson asserted. Recommends polymorphic groups for observations on species formation; such are violets, roses, *Draba verna*, Oenotheras, etc. Progressive mutations are very rare but loss mutations relatively frequent. De Vries takes exception to authors like Davenport who deny progressive mutation and explain evolution by loss of genes from primitively complex conditions of germ plasm. Mutants *gigas*, *lata*, *scintillans*, considered progressive mutations, because of increase in chromosome number, but author recognizes that convincing criterium of such mutation is still wanting. Investigators of future must find laws of mutation in order that process may be controlled at will.—*J. P. Kelly.*

478. Gates, R. Ruggles. **A systematic analytical study of certain North American Convallariaceae considered in regard to their origin through discontinuous variation.** Ann. Bot. 32: 253–257. April, 1918.—Résumé of a paper to appear after the war. Application of mutationist conceptions to systematic work, i.e., specific differences treated as definite and marked variations rather than as accumulation of small differences with later elimination of intermediates. Species of Disporum distinguished chiefly by presence and absence characters, such as may have arisen as single mutations, and only to minor extent by quantitative characters; *D. trachycarpum* has reticulated fruits while others have them smooth; *D. oregonum* has entire instead of the three-cleft stigma of eastern species; *D. Smithii* and *D. Hookeri* form pair differing respectively by white and green flowers, hairy and glabrous pistil, ciliate and nonciliate leaf margins. Such differences are unlikely to be advantageous and seem result of sudden chance variation which heredity perpetuates and so gives new species; their comparative recency of origin are to be judged by relative areas occupied. Briefly considers also species of Clintonia, Smilacina, Uvularia, Oakesia and Streptopus.—*J. P. Kelly.*

479. Gates, R. Ruggles. **A systematic study of the North American Melanthaceae from the genetic standpoint.** Jour. Linnean Soc. Bot. 44: 131–172. May, 1918.—Author applies to specific and generic differentiation of Melanthaceae the mutation conception of marked or discontinuous variation rather than exclusively the Darwinian conception of gradual differentiation of species. Author recognizes that continuous variations sometimes lead from species to species but claims such are as yet incompletely analysed and significance unknown despite current belief that "fluctuations" are not inherited. Many cases of discontinuity due to extinction, but many more seem due to definite variation. Existence side by side of related genera with marked differences indicates latter to be not of selective value and mutation theory accounts for such. Triantha differs from Tofieldia partly in having rough pubescence and flowers in clusters of three instead of singly; this might have resulted from two mutations. Pleia is isolated and extinction must have occurred between it and nearest relatives. Filaments of Narthecium bear dense wool probably of no service, originating probably through mutation, persisting through inheritance. Within genus Narthecium specific differences are chiefly small, quantitative, of type which Darwin's theory postulates. Amianthium, Xerophyllum, and Stenanthium are essentially bitypic genera in which species differ largely in having broad or narrow leaves; this indicates possibility of tetraploid mutation or cell-gigantism. Fourteen other genera are listed and discussed.—*J. P. Kelly.*

480. Hodgkinson, Edith E. **Some experiments on the Rotifer Hydatina.** Jour. Genetics 7: 187–192. May, 1918.—Observations were made on 42 families of rotifers, each containing

from 2–17 generations, in order to determine whether pure female-producing families or strains existed. Male-producing females, however, appeared in all of these families either in first or subsequent generations and conclusion was reached that pure female-producing families do not exist.

Rotifers kept in very strong solution of horse manure and fed colorless protozoa which grew in this solution yielded no male-producing females. Their repression was presumably due to influence of the strong horse manure solution. In other experiments rotifers were fed colorless protozoa that grew in the horse manure solution after they had been first thoroughly washed and freed from all of the solution. Very few male-producing females were produced from this feeding, although with removal of inhibiting influence of strong horse manure solution many male-producing females were expected.

In experiments extending through 15 generations in which rotifers were fed colorless protozoa in the horse manure solution about 6 per cent. of individuals were male-producing females, but when diet was changed to one of Euglena in water free from horse manure solution, percentage of male-producing females was changed from about 6 per cent. to about 71 per cent. This high percentage of male-producing females may have been caused: by stimulus of sudden change of diet; by removal of inhibiting influence of horse manure solution; by more oxygen in Euglena solution; or by food itself in Euglena.

Certain lots of rotifers fed on scanty diet of Euglena and other lots on copious diet of Euglena produced about 42 per cent. and about 51 per cent. of male-producing females, respectively. Whether this higher percentage of male-producing females was caused by an increased supply of oxygen or by more food was not determined.—*D. D. Whitney.*

481. HULL, J. E. **Gynandry in Arachnida.** Jour. Genetics 7: 171–181. *1 fig.* May, 1918.—Author brings together eight cases of gynandry among spiders belonging to eight species and two families. Of these, one was observed and described by Hull himself, the others by various writers.—Cases most carefully described he divides into three classes: (1) One side male, other female,—sexual structures perfect except for distortion resulting from union of dissimilar halves on median line; (2) like 1, except that one side is imperfectly developed before, the other behind; (3) one side perfectly female before and male behind, the other perfectly male in front and female behind. To last class belongs example described by author. This displayed typical male characters on right side of cephalothorax, including its appendages, left side being female, while in genital region of abdomen, conditions were reversed.—*F. B. Sumner.*

482. ISHIKAWA, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. April, 1918.—Author deals with gametophytes and fertilization in *Oe. nutans*, *Oe. pycnocarpa*, and their hybrids. Female gametophyte is tetranucleate. In four out of over 500 sections, particles resembling chondriosomes occurred in egg. Twin embryo sacs are common; nothing conclusive as to fate of second embryo sac. Persistency of more than one megaspore considered atavistic. Male nucleus had plasma sheath which is shed before fusion with egg. Occasional presence of more than two male nuclei in embryo sac; author records fusion of one egg with two male nuklei and refers to bearing of this on triploid mutants. *Oe. nutella*, one of the two hybrids between *nutans* and *pycnocarpa*, was self-sterile owing to sluggish growth of pollen tube. [This is repeatedly printed *Oe. nutanella.*]— *J. P. Kelly.*

483. LAUGHLIN, H. H. **Modifications of the 9 : 3 : 3 : 1 ratio.** Amer. Nat. 52: 353–364. June–July, 1918.—Accompanying figures describe experiments chemically paralleling what must happen when F_1 genes develop traits in F_2 somas, in each case of modified somatic dihybrid ratio. Each drawing represents wooden block with holes for holding test-tubes, arranged after manner of Punnett checker-board scheme for illustrating recombination of F_1 gametes into F_2 zygotes. Suitable chemicals are designated for filling gamete-representing tubes, also resulting colors produced when they mix in zygote-representing tubes. All specifications are given for sizes, quantities, etc. for each modified ratio. Section A

presents 10 different di-hybrid ratios which may occur when dominance is complete and segregation normal and independent. Section B illustrates F_2 di-hybrid phenotypic ratio 1: 2: 1: 2: 4: 2: 1: 2: 1, involving normal segregation with somatic blending, as assumed by Davenport for inheritance of skin color in Negro-White crosses. Section C deals with combination of complete dominance in one factor and blending in other, giving ratio 3: 6: 3: 1: 2: 1. Author suggests that genes in gametes might be better represented in solid form by chemicals in capsules which slowly dissolve in substratum of zygote.—*E. E. Barker.*

484. Lindstrom, E. W. **Chlorophyll inheritance in maize.** Mem. Cornell Univ. Agric. Exp. Sta. 13. *23 × 16 cm., 68 p., 5 colored pl.* Cornell University, Ithaca, N. Y. Aug., 1918.—Author reports six chlorophyll characters of maize. all simple recessives to normal green, crosses of any two giving green F_1. Two seedling (white, *w*, and virescent white, *v*) and four mature-plant characters (golden, *g*, green striped, *st*, *japonica* striped, *j*, fine striped, *f*). Virescent white changed to yellow and white striped *japonica* to yellow striped in presence of *l*. Aleurone color factor *R* represses *japonica* striping, *r* allowing full development. Normal green is *W V G St J F* and *L* or *l*. Independent Mendelian inheritance with 9: 3: 3: 1 F results from green F_1 *Gg St st*, and apparently from *G g J j*, *G g F f*, *J j St st*, *J j F f*, *St st V v*; 9: 3: 4 F_2 from *W w V v*; 12: 3: 1 F_2 from *V v L l*. Linkage of *G g* with *L l*, 19 per cent crossing over; *G g* with *R r*, 23 per cent crossing over; *L l* with *R r*, no crossing over, regarded as completely linked rather than allelomorphic. Spotting is recessive or partially dominant, mode of inheritance not fully understood.—*R. A. Emerson.*

485. Lippincott, William A. **The factors for yellow in mice and notch in Drosophila.** Amer. Nat. 52: 364–365. June–July, 1918.—Author maintains that the two cases named may be due either to two separate but closely linked genes, one producing the observed somatic effect, the other being a recessive lethal; or to a single gene that produces both effects. He thinks question may be decided by attempting to separate the somatic effects from possibly accompanying lethals by crossing over.—*A. H. Sturtevant.*

486. Miyazawa, B. **Asagao ni okeru ha no iro to hana no iro to no iden. [Inheritance of leaf-color and flower-color in the Japanese morning-glory.]** [In Japanese.] Nôgakukwai Kwaihô. [Report Agron. Soc.] **190: 603–638.** June, 1918.—Parents used in hybridization were yellow-leaved (*chlorina*) plants with white flowers and green-leaved ones with flowers of peculiar red color distinguished by its darkness ("kaki-color" in Japanese, very common in flowers of Japanese morning-glory). All F_1 plants made in either reciprocal way are green-leaved and bear flowers of bluish red color, quite a different color from either parent. In F_2 author confirms observations of Takezaki (Bot. Absts. 1, Entry 502), that green and yellow-leaved plants occur in ratio 3 : 1. Flower color in F_2 was very various, the dark red ("kaki") color is found exclusively in flowers of green-leaved plants and never on yellow-leaved ones, though green-leaved plants do not necessarily bear dark-red flowers, suggesting possible linkage (either coupling or repulsion) between color characters of leaves and of flowers. Author shows however that if flowers are distinguished simply into colored and white ones, green-leaved and yellow-leaved plants segregate, each into 3 colored and 1 white, respectively, giving in F_2, green colored, green white, yellow colored, and yellow white, in usual di-hybrid ratio 9: 3: 3: 1. Author denotes green-leaved parent with dark red flowers by the formula *GGKK* (*G*, green leaf-color; *K*, dark red flower color), and consequently yellow-leaved parent with white flowers by *ggkk*. He thinks that *K* is able to produce dark red flower-color, only when the accompanying *G* is in homozygous condition, but produces ordinary red color when *G* is either entirely absent or in heterozygous condition. Author has confirmed this hypothesis by culture experiments extending to F_4 and also by back-crossing. For instance, F_1 plants have no dark red flowers in spite of their green leaves, because *G* is then in heterozygous condition, i.e., *GgKk*. Other examples of relation between flower color and leaf color are as follows: *GGKk*, green and dark red; *GgKK*, green and ordinary red; *GGkk*, green and white; *ggKK*, yellow and red.—*S. Ikeno.*

487. Morgan, T. H. **Concerning the mutation theory.** Sci. Monthly 5: 385–405. May, 1918.—The criticism that mutation theory does not explain evolutionary progress which is apparently continuous is shown to be based on misconception that mutations are necessarily "large" steps. Difference in genetic behavior between usual type of mutation and type originally described for Oenothera seems largely explained by hypothesis of "balanced lethals," which accounts for permanent heterozygosis, for certain small classes simulating mutations, and for twin or multiple hybrids in F_1. Examination of nature of gene as unit of mutation shows that objections to such units furnishing materials of evolution are invalid. A mutant species idea is gaining ground over strict unit character idea because of accumulating evidence of manifold effects of single mutant genes.—*C. B. Bridges.*

488. Morgan, T. H. **Changes in factors through selection.** Sci. Monthly 5: 549–559. June, 1918.—Significance for the selection theory, of class of mutations known as "specific modifiers," is emphasized. Three criteria by means of which presence of such modifiers can be made probable, and fourth method by which their presence can be demonstrated, are described and illustrated. Proof that certain series of multiple allelomorphs are not examples of close linkage is derived from knowledge of origins of the different allelomorphs. Possible relations of multiple allelomorphs to selection are examined. Implication sometimes made that selection may determine order of appearance of allelomorphs is shown to be groundless.—*T. H. Morgan.*

489. Morgan, T. H. **Evolution by mutation.** Sci. Monthly 5: 46–53. July, 1918.—Each species is conceived to be product of definite set of co-acting genes which have their present effect as result of series of mutative processes. Relationship between different species is an expression of relatively large number of genes possessed in common. Evidence is fast accumulating that common genes probably undergo analogous mutation in related species, the direction being conditioned by physico-chemical constitution of the gene and not by some hypothetical "directive force." Mutations furnish natural selection with its working material, relatively few producing characters better adapted to available environments than original characters. Bulk of successful mutations are not improbably those of slight somatic effect so that evolution of characters frequently appears continuous.—*C. B. Bridges.*

490. Newman, H. H. **Hybrids between fundulus and mackerel. A study of paternal heredity in heterogenic hybrids.** Jour. Exp. Zool. 26: 391–421. *2 pl.* Aug., 1918.—In Echinoids, inseminations of eggs with sperm of other orders, classes, and even phyla, may be accomplished by chemical means, but no real fertilization reactions occur. Actual hybridization is restricted to species within the order Diademoida. Also in fish, hybridzation is restricted, so far as known, within one order, the Teleostei. Artificial aid is unnecessary in crossing practically all Teleosts. *Fundulus heteroclitus* and *Scomber scombrus* were chosen because the differentiating characters of the larval stages, red chromatophores of Fundulus and green ones of Scomber, adapt this cross to demonstrate facts about heterogenic hybridization. Study of heredity is limited to cross of Fundulus ♀ and Scomber ♂ as all stages to hatched larvae are obtained, while embryos produced by reciprocal die before, or during, gastrulation. Paternal heredity is made obvious by appearance of green chromatophores in hybrid larvae. Hybrids subnormal with respect to apical structures (eyes, heart, etc.), predominate. The more pronounced the abnormality, the greater number of paternal chromatophores present. Conclusion seems justifiable that "in proportion as the paternal element vigorously exercises its functions, in like proportion is development retarded and the various types of monster appear." Most successful embryos are without paternal chromatophores; not result of parthenogenesis, but recovery from disharmonious paternal influence which generally retards development. Large number of eye and heart abnormalities is due to differential inhibition, effect of which, according to Child's "axial gradient" hypothesis, is to induce more abnormalities in apical than in basal parts of embryos. Differential recovery is indicated by occasionally finding embryos with enlarged apical and reduced basal parts, and even isolated eyes and hearts, with rest of egg undifferentiated. These embryos

are usually without paternal chromatophores at least in region of differentiation. These are considered as "differential recovery products," occurring only after prolonged inhibition. Heterogenic hybrids are subnormal, due to active functioning of disharmonious paternal materials. These materials must be eliminated or neutralized in order that proper structural differentiation may result. [Abst. in Physiol. Absts. 3: 457, 458. Nov.-Dec., 1918.]—*R. K. Nabours.*

491. NOHARA, S. **Endô no keisitu iden ni tuite. [On the inheritance of certain characters in the pea.]** [In Japanese.] Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.] 2[2]: 12–14. May, 1918.—**Genetic studies in some characters in Pisum.** Bot. Mag., Tôkyô, 32: 91–102. *2 fig.* May, 1918.—Hybridization of Japanese race of white pea (Japanese name "Siroendo") and French "Sans parchemin très large cosse" (de Vilmorin), both of which produce soft edible pods, has given rise in both reciprocal crosses, to plants with hard inedible pods, hardness being due to the development of parchment-like tissue. Author compares this with production of purple-flowering sweet peas from two white-flowering plants, and thinks that inedible pods are due to meeting of complementary factors *L* and *D*, one of which was present in either parent. This supposition was confirmed by F_2 generation, which contained plants in ratio 9 hard : 7 soft, and further proved by F_3 generation. How these two complementary factors differ from each other is yet unknown.—*S. Ikeno.*

492. PUNNETT, R. C., AND THE LATE MAJOR P. G. BAILEY. **Genetic studies in poultry. 1. Inheritance of leg-feathering.** Jour. Genetics 7: 203–213. May, 1918.—Crosses were made of Langshan males on Brown Leghorn females and of Hamburg males on Langshan females. Langshans have moderately-feathered shanks, the others are clean-shanked. Feathered shanks are incompletely dominant in F_1. The partial dominance is referred to modifying factors. Ratios in F_2 and various back-matings indicate that feathered shanks are due to single Mendelian factor. In order to bring observations of other workers into line, it is suggested that some booted races may have two factors for feathered shanks while some clean-shanked races may have an inhibitor.—*H. D. Goodale.*

493. RAYNER, M. C. **Notes on the genetics of Teucrium scorodonia crispum (Stansfield).** Jour. Genetics 7: 183–186. *1 pl.* May, 1918.—Preliminary note is given of the results obtained in crossing "wood-sage" variety *Teucrium scorodonia crispum* (Stansfield) which is characterized by "crisped" or "crested" leaves, with wild plants of *T. scorodonia.* Plants of *T. scorodonia crispum* used in crossing are vegetative descendants of wild plants found at least 50 years ago and have shown no tendency to revert to normal type. They bear normal flowers and viable seed and produce self-sown seedlings with normal foliage. F_1 plants gave no indication of their hybrid origin. Selfed F_1 plants gave 200 seeds which produced 89 plants with no trace of "cresting." F_1 plants crossed with "crested" grandparent, using latter as pollen parent gave 12 seeds which failed to germinate. Author suggests that seeds carrying "crested" characters may be either non-viable or that seedlings died soon after germination. Experiments must be repeated and extended before correct hypothesis can be founded.—*Richard Wellington.*

494. RICHARDSON, C. W. **A further note on the genetics of Fragaria.** Jour. Genetics 7: 167–170. May, 1918.—Pink-flowering *F. vesca* × white gave approximately 15 : 1 ratio in second generation. Reciprocal crosses between single and double *vescas* produced in F_2 3: 1, likewise cross "hairy" stems × not hairy.

Evidence presented on sex inheritance showing female dominance. Ratio 9 : 7 resulted by placing sterile flowers with sex to which they appeared to belong, and hermaphrodites and males together. 200 F_1 plants (*virginiana* × *vesca*) flowering in open, gave 4 females and 3 hermaphrodites setting one or two seeds on each plant. Respective crosses *vesca* × *Daltoniana* and *vesca* × *chiloensis* yielded no free-fruiting plants.—*R. J. Garber.*

495. Rickards, Esther, and F. Wood Jones. **On abnormal sexual characters in twin goats.** Jour. Anat. 52: 265–275. April, 1918.—Examination of twin goats having at first the appearance of females but later developing masculine characteristics showed both to be abnormal in that both male and female structures were present in reproductive system. Gross anatomical and microscopic studies were made of organs, drawings of which are presented. Author believes origin of these twins to be monozygotic; that Lillie's theory that abnormally sexed individual is produced by action of sexual hormones developed by other twin is disproved; and that these animals were males, "the external genitalia of which are incompletely masculine at birth, and in which also the usual rudiments of the female internal genitalia are altogether unduly developed." Male gonad is late in exerting its influence, thus producing such abnormal individuals.—*Elmer Roberts.*

496. Robbins, Rainard B. **Partial self-fertilization contrasted with brother and sister mating.** Jour. Genetics 7: 199–202. May, 1918.—A. B. Bruce stated in earlier paper that "for simple cases it will be found if individual matings are worked out in detail that any such hypothesis as continued brother and sister mating, or continued mating of first cousins, can be expressed in terms of a fixed proportion of selfed individuals to individuals mated at random," and assumed this to be a general truth. Author demonstrates that such general assumption is erroneous, for the heterozygous type tends to disappear in continued brother and sister mating, but in a combination of self-fertilization and random breeding the heterozygous type can never disappear. Hence no combination of random mating and self-fertilization can represent continued brother and sister mating.—*J. Detlefsen.*

497. Roberts, Elmer. **Correlation between the percentage of fat in cow's milk and the yield.** Jour. Agric. Res. 14: 67–96. *2 fig.* July, 1918.—Generally accepted that low-yielding cows produce higher percentage fat than do high-yielding cows, though not previously demonstrated by statistical investigation. Wilson suggested independence of yield of milk and percentage of fat, but did not arrange data to bring out relationship. Author's data furnished by registers of American associations and involve study of many individuals of principal breeds. Yearly tests were made from selected individuals, and relation between yield of milk and percentage of fat found by means of correlation tables. Extensive data included in tables A–H and correlation tables I–XXI are for Jerseys, Guernseys, Holstein-Friesians, Ayrshires, grade Jerseys, grade Holstein-Friesians, and some unclassified. Conclusions: Significant correlation between percentage of fat and yield in all except Ayrshires, in which it is signficant only when groups are treated. Yield of milk increases with age, though may decrease at some time beyond five years. Percentage fat in Jerseys, Guernseys, and Holstein-Friesians remains fairly constant for ages studied. Variation of percentage butter fat not influenced by age according to standard deviation. On same basis breed has influence on variation of milk yield and percentage of fat. For variability in yield, breeds stand in ascending scale: Jersey, Ayrshire and Guernsey practically together, Holstein-Friesian. For percentage of fat: Holstein-Friesian and Ayrshire about the same, Guernsey, Jersey.—*R. K. Nabours.*

498. Saunders, Edith R. **On the occurrence, behavior and origin of a smooth-stemmed form of the common foxglove (Digitalis purpurea).** Jour. Genetics 7 : 215–228. May, 1918. —Common foxglove (*Digitalis purpurea*) has two distinct forms, *pubescens* and *nudicaulis*, the former being more common. *Nudicaulis* is often found growing with *pubescens* but there is no record of its being found alone. The two forms are alike in all respects except as to surface character; *pubescens* possessing stem gray and densely pubescent throughout and leaves very hairy; *nudicaulis* with stem green, polished and smooth from base to flowering region, where it becomes pubescent, the leaves being less hairy than in *pubescens*. The distinguishing feature of *nudicaulis* is a character common to several other species within the genus, examples of which are given by the author. Both forms are equally fertile, setting seed abundantly and both, when pure, breed true. The origin of *nudicaulis* may be explained on one of the following hypotheses: (1) It may be hybrid—but this is doubtful since F_1

hybrids between the two forms, when selfed, yield 3 : 1 ratio with *nudicaulis* dominant. F_1 hybrids bred back to recessive yield 1 : 1 ratio. (2) The two forms may have had parallel development from common ancestor. (3) *Nudicaulis* may be mutant from *pubescens*—but it is unlikely that dominant mutant should be derived from recessive type. (4) *Pubescens* may be (though more common in occurrence) recessive mutant from *nudicaulis*. According to accepted view we have in *Linaria alpina* similarly, the type in recessive spotted form, and variety in dominant *concolor*. Author found in studying certain abnormal features (1) that peloria and heptandry (two modifications of corolla, both recessive to normal) are inherited independently and (2) that margins of sepals may rarely be thickened and bear structures having appearance of rudimentary ovules.—*M. N. Pope.*

499. SAX, KARL. **The behavior of the chromosomes in fertilization.** Genetics 3: 309–327. *2 pl.* July, 1918.—Description with illustrations of stages in first division of fertilized egg in *Fritillaria pudica* and *Triticum durum hordeiforme*. In Fritillaria no continuous spireme was demonstrable. 12 chromosomes from each parent split longitudinally and 24 chromosomes proceed to each pole. In lower polar nucleus chromosomes become doubled in number, resulting in primary endosperm nucleus with $4x$ chromosomes, $3x$ maternal and $1x$ paternal. No evidence that maternal and paternal chromosome groups remain distinct even in first division. In Triticum separate spiremes are formed by egg and sperm nuclei after latter enters egg. About 14 chromosomes from each split longitudinally, 28 going to each pole. In triple fusion each nucleus contributes 14 chromosomes, and there is evidence that the contributions from the several nuclei may remain more or less separate even in metaphase of first division. In both species first division of zygote is like any other somatic mitosis, and in triple fusion neither shows pairing of chromosomes, and first and following divisions appear to be regular. Author points out that telosynapsis would present difficulties for hypothesis of linear arrangement of genetic factors. He finds no evidence of cytological basis for somatic segregations.

500. STAKMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. **Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance?** Jour. Agric. Res. 14: 111–124. *6 pl.* July, 1918.—Barley, which is moderately susceptible, and susceptible varieties of wheat, did not change parasitic capabilities of *Puccinia graminis tritici-compacti* so that it attacks a normally resistant wheat. Continued association with resistant wheat did not cause the rust to attack this wheat more virulently.

P. graminis tritici was used to determine the action of hybrids as bridging forms. Infection capabilities of this rust were not changed on either resistant or susceptible parents after growth on susceptible F_1, F_2 or F_3 hybrid plants.

Bobs, which Pole Evans found immune to stem rust in South Africa was found to be susceptible. Resistance of wheats may vary in different regions because of presence of different biologic forms of rust.—*H. K. Hayes.*

501. STOCKARD, CHARLES R., AND GEO. N. PAPANICOLAOU. **Further studies on the modification of the germ-cells in mammals; the effect of alcohol on treated guinea-pigs and their descendants.** Jour. Exp. Zoöl. 26: 119–226. May, 1918.—Data are given on 1170 animals, of which about 900 belong to alcoholic lines (600 with practically no inbreeding, 300 more or less inbred) and rest are controls. The alcoholic lines include immediate and more remote descendants of animals treated by inhaling alcohol fumes. Direct effects of such treatment on subjects was practically nil, but alcoholic lines were inferior to control lines for average size of litter was smaller, conception failed more frequently, early and late prenatal death rates were high, abnormalities were much more frequent, and surviving offspring were smaller and grew more slowly. Mortality in alcoholic lines was high largely because elimination occurred by absorption and abortion of embryos and fetuses. Elimination is thus selective. Progeny closely related to treated stock were inferior but later descendants further removed from treated ancestors are progressively improved. Treating male ancestors for one and two generations as compared with similar treatment of female

ancestors showed worse results in the latter case, presumably because alcohol acted on developing embryos as well as on germ-plasm. Peculiar sex-ratios occurred, suggesting in part differential sex mortalities during early prenatal life, but the case is not entirely clear.—*J. A. Detlefsen.*

502. Takezaki, Y. **Asagao no iden II. [Inheritance in the Japanese morning-glory.]** [In Japanese]. Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.]. 2^2: 7-11. May, 1918.—From ancient times it has been very well known among Japanese gardeners that some strains of Japanese morning-glory (Ipomoea) behave like some strains of Matthiola or Petunia, in that they always segregate into plants with single flowers and those with fully double ones, the latter being completely sterile. Author finds ratio of these two kinds of plants produced by self-fertilization of such a strain of the Japanese morning-glory, is 3 : 1. Hybridization of plants with single flowers derived from this partially double-flowering strain, with plants of the ordinary single-flowering strains, give rise to F_1 plants, all with single flowers. Offspring of some F_1 plants bear exclusively single flowers, while progenies of other F_1 plants segregate into equal numbers of single and of double-flowering. Author concludes that double-producing strain of the Japanese morning-glory is a heterozygote with both eggs and pollen cells of exactly similar factorial composition, which behaves as a simple Mendelian monohybrid, thus being much simpler than eversporting "d-strain" of Petunia, etc., studied by Miss Saunders.—*S. Ikeno.*

503. Weatherwax, Paul. **The evolution of maize.** Bull. Torrey Bot. Club **45**: 309-342. *36 fig.* Aug., 1918.—Review of theories of evolution of maize and morphological study of all parts of plant of three related genera,—Zea, Euchlaena, Tripsacum,—showing the structural similarity of all three groups when vestigial organs are considered. Homology between female and male spike of Euchlaena shown and thereby close similarity between female inflorescence of Euchlaena and that of Zea. Ear of maize considered to be homologue of central spike of tassel. No morphological evidence to show that either was derived by fusion of more simple parts, agreeing with the view of Montgomery and of Collins. No support is given Collins's hypothesis that maize arose through a process of hybridization between Euchlaena and some member of the Andropogoneae. Three genera,—Zea, Euchlaena, Tripsacum,—considered to have independent descent from common, extinct, ancestral form. [Abst. by J. M. C[oulter] in Bot. Gaz. 67 : 104. Jan., 1919.]—*D. F. Jones.*

504. Whiting, P. W., and Helen D. King. **Ruby-eyed dilute gray, a third allelomorph in the albino series of the rat.** Jour. Exp. Zool. 26: 55-64. May, 1918.—Describes new variety of Norway rat known as "ruby-eyed dilute gray" found near University of Pennsylvania. New variation is recessive to intense pigmentation. When crossed to black-hooded rats all F_1 individuals were intense, and F_2 generation showed 33 intense and 14 dilute. Ruby-eyed dilution is allelomorphic to albinism. The F_2 individuals, called fawns, are intermediate both in hair and in eye color. Fawns when bred together produced eighty ruby-eyed dilutes, 156 fawns, and 80 albinos. Ruby-eyed dilutes crossed with red-eyed yellow rats produce rats of the wild type. Second generation shows evidence of linkage of the two factors, since double recessives did not appear. No linkage is apparent with hooding or with non-agouti.

In agouti dilute sepia pigment is restricted to tips of hairs. Non-agouti are more heavily pigmented.—*F. B. Sumner.*

505. Wright, Sewall. **Color inheritance in mammals. XI. Man.** Jour. Heredity 9: 227-240. May-June, 1918.—With respect to color variations in hair, skin and eye of man, only certain rare ones, obviously associated with particular families, depend upon demonstrated unit-factors. Premature grayness, white spotting and albinism belong here. Notwithstanding apparent inheritance of last as a discontinuous variation, no sharp line can be drawn among Europeans between albinism and extreme blondness. There are all grades of imperfect albinos, which may or may not show visual difficulties. View may be safely accepted that albinism in general is due to recessive factors, though no one unit factor is believed to explain all the phenomena.

The ordinary variations in skin, hair, and eye color, are much more difficult to interpret. None of these is obviously discontinuous. All grades between dark brunette and fairest blond are common in persons of British descent. Even with eye color, it appears to author that discontinuity is superficial, there being all grades, depending on amount and situation of pigment. Simple Mendelian interpretations have been attempted, but involve great discrepancies. For example, two blue-eyed parents have been known to have brown-eyed children, which is contrary to theoretical expectations. In general the factor or factors for light eyes tend somewhat more to be recessive than dominant, but no single unit factor seems to be principal cause of differences.

As regards hair color, author believes there is abundant evidence of segregation of some sort. But he also holds that if there is one main factor by which red and light brown differ from black, it must be imperfectly dominant, and that there must be other factors which raise or lower the pigmentation of the heterozygotes from one extreme to the other. Inheritance of skin color, he also believes to give evidence of segregation, though it is impossible to speak of particular Mendelian factors as demonstrated. Thus hair, skin and eye color agree in presence of Mendelian segregation of a complex kind, with dominance tending toward darker types, but probably imperfect as a rule.

Correlation of hair and eye color is treated at considerable length. Familiar association of light hair with blue eyes and dark hair with brown eyes is recognized, but there is still the problem whether this association does not hold merely for races, there being perhaps no such correlation in individuals of a single race. Absence of assortative mating, on such a basis as would account for the correlation between hair and eye color which is found in individuals, is believed proved by analysis of data of Holmes and Loomis. Assortative mating occurs with respect to eye color, but is distinctly negative, i.e., there is shown a distinct preference for a *different* eye color. Author concludes there is no question but that light hair is connected physiologically with light eyes, not only racially but individually.

Particular combinations of hair and eye color are found to be hereditary. This in spite of fact that the parents in population analyzed seem to have preferred to marry those of the color combination most remote from their own.

Author frames provisional hypothesis as to factors concerned in skin and eye color and attempts to compare with similar relations in other mammals. Subject of "color and race" considered briefly, three color races being recognized in Europe: (1) typically blue-eyed, flaxen-haired people around Baltic and North Sea; (2) a "zone of segregating colors," containing various combinations, surrounding this "area of extreme blondism;" (3) outside the latter, the typically brunette populations of southern and southeastern Europe and Asia.—*F. B. Sumner.*

506. Yamaguchi, Y. **Beitrag zur Kenntnis der Xenien bei Oryza sativa. [Contribution to the knowledge of xenia in Oryza sativa.]** Bot. Mag. Tôkyô 32: 83–90. May, 1918.—Well known fact that starch character of ordinary rice (staining blue by iodine) is dominant to glutinous starch (staining red by iodine, owing to its containing amylodextrin). By means of iodine reaction of rice grains themselves as well as of their extracts (by alcohol, ether, water) author was able to distinguish hybrid grains from ordinary rice grains colorimetrically. Hydrolysis of extracts by certain acids shows that quantity of invert-sugar in hybrid grains is intermediate between that of ordinary and of glutinous rice grains. Hybrid grains were thus shown to be chemically different from ordinary ones, though apparently quite similar to them. Author concludes therefore that in this case dominance is imperfect. —*S. Ikeno.*

HORTICULTURE

W. H. Chandler, *Editor*

[Unsigned abstracts are by the editor.]

507. Albro, F. W. **Chemical constants of avocado oil.** Ann. Rep. California Avocado Assoc. 1917: 92–93. April 30, 1918.—Considerable difficulty is experienced in extracting

avocado oil from the fresh pulp. Some was extracted however with petrolic ether, the solution filtered through charcoal, and after further treatment with CO_2, an oil was obtained of a light golden color, with a bland and pleasant flavor. The chemical constants of the oil are given in tabular form in comparison with olive oil, butter fat, and cottonseed oil.—*I. J. Condit.*

508. ADAMS, CHAS. D. **Notes on avocado varieties for commerical orchards.** Ann. Rept. California Avocado Assoc. 1917: 31–34. April 30, 1908.—Popular.

509. ANONYMOUS. **Effect of June drop is still problematical.** The California Citrograph 3^{10}: 237. Aug., 1918.—Summary of the situation by editor.

510. ANONYMOUS. H. J., **Timely hints for avocado growers.** Florida Grower 17^{10}: 26. March, 1918.

511. ANONYMOUS. **Avocado varieties recommended for planting in California.** Ann. Rept. California Avocado Assoc. 1917: 101–103. April 30, 1918.—Recommendations by the Committee on Classification and Registration of Varieties.

512. BEACH, JOHN B. **The avocado in Florida.** Florida Grower 17: 7. Feb. 2, 1918.—Popular.

513. CHACE, E. M. **Citrus byproducts.** Florida Grower. 17: 9. Feb. 23, 1918.—Italian hand process for making essential oil of lemon is briefly described. This oil has not been successfully produced in United States of America on account of high labor cost and lack of a suitable mechanical method of production. Citrate of lime is made in same general way both in Sicily and United States of America. Process of producing citric acid from citrate of lime is described with brief discussion of the relative merits of wood, lead, enamelled ware and monel metal containers. Lemons and limes are the only citrus fruits containing sufficient citric acid to make recovery of the acid profitable. A very good grade of vinegar can be made from orange juice, about 1½ barrels being obtained from a ton of fruit.—*C. P. Wilson.*

514. CLARKE, SAM W. **Why I prefer the Kadota fig.** Fig and Olive Jour. 3^1: 11. *fig. 1.* June, 1918.—Popular.

515. COLLINS, C. F. **The fig and its culture.** California Cultivator. 50: 324. March 16, 1918.—General.

516. CONDIT, I. J. **The avocado in Central and Northern California.** Ann. Rept. California Avocado Assoc. 1917: 35–38. April 30, 1918.—Popular.

517. CULBERTSON, J. D. **Renewing old lemon trees.** California Citrograph 3: 202–203. *6 figs.* July, 1918.—An experiment in rejuvenating lemon trees twenty-five years old whose fruit production had become impaired. Shows effects of pruning at different seasons of the year. Discusses effects of various conditions on the subsequent behavior of the tree. Quality of the fruit was improved, but total quantity harvested was decreased by the pruning.—*H. S. Reed.*

518. DEWEY, MRS. M. H. **June drop.** California Cultivator 50: 198. Feb. 16, 1918.—Popular.

519. DEZELL, E. G. **Why the citrus industry needs a protective tariff.** California Citrograph 3: 226–227. Aug., 1918.—The author, representing the Citrus Protective League of California, presented to the U. S. Tariff Commission through its representative, William S. Culvertson, a résumé of conditions confronting the grower and shipper of citrus fruits,

especially the need for a protective tariff for the lemon industry. This is the situation according to Mr. Dezell: There is a possibility of a "dumpage" of Italian lemons after the war since her European markets are demoralized. The Italian lemons will not be needed to supply the demand of this country. Seventy-five per cent of the lemon acreage of California has been non-bearing but is rapidly coming to production which will more than supply the demand of Canada and United States. Increased advertising setting forth the uses of lemons is anticipating this situation. Moreover, the larger production and distribution costs due to the war make competition with foreign markets difficult. Even before the war the cost of delivering a box of California lemons in New York was $2.73 as against $1.17 for the Italian lemons. Mr. Dezell gave several tables comparing transportation rates, increased labor and material costs, and home and foreign production so that the Tariff Commission would know the status of the industry to guide it in determining future tariff rates. The condition of the orange industry was also given but the danger from foreign "dumpage" is not so imminent.—*L. W. Bartlett.*

520. Elliott, J. M. **Utility and sentiment applied to the avocado.** Ann. Rept. California Avocado Assoc. 1917: 83–84. April 30, 1918.—Popular.

521. Englehart, J. P. **Pruning lemon trees according to types of wood.** California Citrograph 3: 229. Aug., 1918.—Popular.

522. Fesler, Martin. **My experience in growing the avocado.** Ann. Rept. California Avocado Assoc. 1917: 29–30. April 30, 1918.

523. Fleet, W. H. **Pruning lemon trees.** California Citrograph 3: 146–149. *15 figs.* May, 1918.—Description of a method of pruning lemon trees by which new shoots are frequently cut back to induce branching. Practical directions are given.—*H. S. Reed.*

524. Grossenbacher, J. G. **Fertilization of citrus groves.** Florida Grower 17 [16]: 10. *1 fig.* April 20, 1918.—The subject is discussed under three headings: (1) the time and number of applications to make per year; (2) the amount and manner of applications, and (3) the percentage, composition and source of the necessary elements, if mixed goods are used, and the substances to apply when the simple materials are given. The writer presents his views on these topics as gained from experience and observations.—*I. J. Condit.*

525. Heiny, Francis. **Fig culture in the Imperial Valley.** Fig and Olive Jour. 3[3]: 11. July, 1918.—Popular.

526. Hirtzler, Victor. **The avocado for the table.** Ann. Rept. California Avocado Assoc. 1917: 51–54. April 30, 1918.—A popular article with recipes and directions for the use of the avocado.

527. Hodgson, R. W. **This winter's cover crops especially important.** California Cultivator 51: 203. Aug. 31, 1918.—Author calls attention to the ruling of the State Food Administrations against the use for fertilizer of materials suitable for stock feed, and also to the scarcity of manure and the high cost of commercial fertilizers. He states, therefore, that the citrus grower is now virtually under the necessity of raising a green manure crop and gives details of planting and handling winter cover crops.—*Gordon Surr.*

528. Hodgson, R. W. **Some pointers on June drop.** California Cultivator 50: 689. *fig. 1.* June 8, 1918.—Popular.

529. Hodgson, R. W. **The Washington navel drop in 1918.** California Cultivator 51: 99. *1 fig.* Aug. 3, 1918.—Popular.

530. HODGSON, R. W. **More June drop discussion.** California Cultivator 50: 260. Mar. 2, 1918.—Popular.

531. HODGSON, R. W. **What is a rational system for pruning the Valencia?** California Cultivator 51: 178. *1 fig.* Aug. 24, 1918.—Popular.

532. HODGSON, R. W. **Citrus blast.** Quart. Bull. State Hort. Bd. Florida 2: 123-130. *2 Pl. 1 fig.* Jan., 1918.—Information contained in previous articles.

533. JAFFA, M. E., AND F. W. ALBRO.—**Studies on the composition and nutritive value of some sub-tropical fruits.** Ann. Rept. California Avocado Assoc. 1917: 85-91. April 30, 1918.—Tables are given indicating the chemical and physical analyses of the avocado, guava, sapote, and Feijoa, the main part however referring to the avocado. A tabular statement shows that large avocados contain a smaller percentage of oil than small avocados. Experiments conducted at the Nutrition Laboratory have shown that the digestibility of avocado oil is equal to that of other oils. A comparison is made between avocado fat and butter fat. The effect of maturity upon the flavor and quality of the avocado is considered and it is recommended that the fruit be picked when the flavor is at its best.—*I. J. Condit.*

534. JENSEN, C. A. **June drop and its relation to the weather.** California Citrograph 3: 255. *5 fig.* Sept., 1918.—An introductory statement is made that no clear-cut case has been made out by students of the "June drop" of the navel orange, for any of the following assigned causes nor for any combination of them, namely, lack of soil moisture at the critical period, low humidity, a certain fungus. Charts are given to show that the climatic conditions of June 1918 were about as good as could be expected in the interior citrus areas and much more favorable than in June 1917. Yet many observers considered the "drop" to be greater in 1918 than in 1917. The importance of taking into account the extremes of local climate rather than the average is emphasized.—*I. J. Condit.*

535. JENSEN, C. A. **Effect of different kinds of organic substances on, and relation of humus to orange yields.** California Citrograph 3: 152. May, 1918.—Details of four experiments, carried out under field conditions in southern California, in which orange trees were basined and mulched with various organic materials. Different substances showed marked differences both on trees and crops, and the yields did not correlate with the amount of humus in the soils. Alfalfa hay and bean straw gave the highest yields while pine shavings decreased the crop. Three of the experiments were started in 1915 and the fourth in 1916.—*Gordon Surr.*

536. JONES, PAUL R. **Rejuvenation of lemon grove by three years' spraying.** California Citrograph 3: 259. *2 fig.* Sept., 1918.—Popular.

537. KELLEY, W. P. **A new sugar in the avocado.** Ann. Rept. California Avocado Assoc. 1917: 92. April 30, 1918.—The author gives a brief summary of the investigation made by Dr. F. B. La Forge in the Bureau of Chemistry at Washington of a new sugar hitherto not known to exist in any of the natural fruits. It differs from all previously known natural sugars in containing seven carbon atoms and is peculiar in the fact that it is apparently unfermentable. The name, D-Mannoketoheptose has been given it. The amount of sugar in the avocado varies from 0.5 to 1 per cent.—*I. J. Condit.*

538. LEWIS, E. S. **Pruning lemon trees six to twenty years old.** California Citrograph 3: 230. *2 fig.* Aug., 1918.—Popular.

539. MARKARIAN, HENRY. **Caprification of the Smyrna fig.** Fig and Olive Jour. 3[1]: 9. June, 1918.—Popular.

540. MILLS, J. W. **The Mission fig.** California Cultivator 50: 39. Jan. 12, 1918.—Popular.

541. MORROW, J. E. **The use of chayotes and their culture.** Florida Grower 17: 5. June 1, 1918.—Popular.

542. NEEDHAM, C. E. **How do the citrus growers view the avocado?** California Citrograph 3: 215. July, 1918.—Popular.

543. NEWBY, E. **The purpose of the California Fig Growers' Assoc.** Fig and Olive Jour. 3[a]: 13. Aug., 1918.—Popular.

544. POPENOE, WILSON. **Avocados as food in Guatemala.** Jour. Heredity 9: 99–107. March, 1918. [Illust.]—The avocado is a very common food in parts of the Guatemalan highlands where the fruits may be obtained during eight months of the year. Only the best fruits are of marketable value and they are sold for about half a cent each. The avocado replaces meat in the dietary of the natives and together with tortillas furnishes a sustaining food for the *cargadores* and other hard workers. References are made to the results of investigations of the California Station and of the Bureau of Chemistry on the food value of the fruit. Comparisons are made between the olive and the avocado as sources of oil.—*I. J. Condit.*

545. POPENOE, WILSON. **Exploring Guatemala for desirable new avocados.** Ann. Rept. California Avocado Assoc. 1917: 104–138. *Pl. III–VIII, fig. 4–34.* April 30, 1918.—An account of the author's trip to Guatemala where he was sent by the Department of Agriculture at the request of the California Avocado Association. Budwood of thirty-six varieties was secured and forwarded to Washington, D. C., and to Miami, Florida, for propagation. The best results in shipping were secured during May, June, and July, the budsticks being simply placed in moist sphagnum moss and wrapped in heavy oiled paper.—All three types of the avocado are found in Guatemala, the West Indian, the Mexican, and the Guatemalan, the last being by far the most important. The West Indian type is common on the coast and is found up to an elevation of 2500 feet where it disappears. The Guatemalan type commences at 3000 feet and is most abundant from 4000 to 6000 feet and disappears entirely between 8500 and 9000 feet. Only two trees of the Mexican type were found.—The climatic zones in Guatemala and the characteristics of each are described and the fruits found commonly in each are listed. The avocado appears to be best in regions where the rainfall is not over 75 inches. In order to obtain hardy varieties the region at the upper limit of cultivation was visited and one variety, the Pankay, was discovered which had not been injured in the slightest by cold although most were killed back or severely injured.—The most important avocado regions are, in the order of their importance, Antigua, San Cristobal Verapaz, Purula, Amatitlan, the valley of Panajachel, and Momostenango. The largest trees were on clay soils yet good sized trees grew upon the volcanic loam of Antigua. The trees seem to have a habit of bearing a heavy crop one year and a light crop or no crop at all the following year. The variation in season of the fruit in Guatemala is due to two causes, first, altitude as expressed in its effect upon temperature, and second, the normal differences exhibited by seedlings. The Guatemalans consider the avocado mature and ready for picking when the tree comes into bloom although the flavor and quality is improved by allowing it to remain on the tree several months longer. Fully half of the seedling fruits found were green in color when mature; the appearance of purple color on certain varieties indicates maturity.—The native home of the Guatemalan type of avocado has not been definitely determined according to the author but he is inclined to believe that it may be in extreme northern Guatemala or across the Mexican frontier in the states of Chiapas and Tabasco.—Detailed notes are given on form, size, character and thickness of skin, color, quality, flavor, and seed of the avocados of Guatemala. A list of twenty-three varieties introduced for trial is given with a description of each and outline drawings of twenty. The article is well illustrated.—*I. J. Condit.*

546. POPENOE, WILSON. **How about the cherimoya?** California Citrograph 3: 102. *1 fig.* March, 1918.—Impressions of the cherimoya are given, as gained by the writer during his trip to Guatemala. The previous statements in literature regarding 16-pound cherimoya were disproved as the largest found weighed just 5 pounds.—As an index to the hardiness of the tree the upper limit of cultivation was found to be only 500 feet below that of the Guatemalan race of avocados. It thrives between elevations of 3000 to 8000 feet where seedlings spring up along the roadsides by the hundreds, but it does not succeed at all in the hot, humid lowlands. The question of pollination of the flowers is considered and the writer ventures the assertion that Southern California is the one place in the United States where the cherimoya can be successfully produced on account of climatic conditions which favor pollination and the proper development of the fruit.—Much variation was observed in the fruitfulness of the seedling trees in Guatemala. Severe pruning to rid the trees of mistletoe seemed to favor fruit production as young wood produces a great abundance of flowers. Some unpruned trees, however, were equally as productive. Budwood of the productive trees in Antigua were sent to the United States for trial.—*I. J. Condit.*

547. RIXFORD, G. P. **Influence on the fig industry of the Maslin seedling fig orchard at Loomis.** Fig and Olive Jour. 3[8]: 14. Aug., 1918.—The Maslin seedling fig orchard at Loomis, California, was planted in 1886 by E. W. Maslin. The orchard containing seventy-two capri fig trees was leased by the U. S. Department of Agriculture in 1910 and since that time large quantities of capri figs and cuttings have been distributed throughout the fig regions of California and others states. New varieties of figs have been developed by crossing and several of these are briefly described.—*I. J. Condit.*

548. ROBERTSON, R. T. **Tangelos: What they are; the value in Florida of the Sampson and the Thornton varieties.** Florida Grower 18: 5. Sept. 21, 1918.—The tangelos are the result of crosses between the tangerine and the grapefruit but the fruits resemble round oranges more than either parent. This article deals with two varieties, the Sampson and the Thornton which have been grown in a small way, chiefly for home use, although commercial plantings are being made at several places in Florida. The characteristics of each are given and the possibilities of similar hybrids discussed especially in regard to resistance to citrus canker.—*I. J. Condit.*

549. ROEDING, G. C. **Caprification and varieties of capri figs.** California Cultivator 51: 27. *3 fig.* July 13, 1918.—The early history of the Smyrna fig in California, the Maslin seedling fig orchard, and the early attempts to introduce the fig wasp (*Blastophaga grossorum*) are discussed. Facts are presented to refute the contentions of G. P. Rixford and W. T. Swingle that the Blastophaga had become established accidentally many years previous to 1899. Notes are given on the life history and habits of the Blastophaga. A few varieties of capri figs which the writer has found satisfactory are listed.—*I. J. Condit.*

550. SCOTT, L. B. **Avocado varieties in Florida.** Florida Grower 18: 4–5. *1 fig.* Aug. 17, 1918.—Popular.

551. SCOTT, L. B. **Strains of Satsuma oranges in the United States.** Florida Grower 17[14]: 7. April 6, 1918.—Variations in Satsuma oranges as observed in the United States by the writer and in Japan by Dr. T. Tanaka are discussed. Six so-called strains are described by Dr. Tanaka in a previous publication, while three strains were classified in this country by the writer and are described in this article. The importance of segregating each of these strains on account of differences in season of maturity, is emphasized.—*I. J. Condit.*

552. SCOTT, L. B. **Strains of Satsuma oranges in United States.** California Citrograph 3: 254. *2 fig.* Sept., 1918.—Information noted from another source. [See Bot. Absts. 1, Entry 550.]

553. SCOTT, L. B. **Comparative merits of the California avocado varieties.** Ann. Rept. California Avocado Assoc. 1917: 57–62. April 30, 1918.—The writer emphasizes the importance of reducing the number of avocado varieties to five or six standard ones which will assure a supply of good commercial fruit throughout the year. The following list includes those which seem to approach the requirements of an ideal avocado: Sharpless, Fuerte, Surprise, Spinks and Taft. Notes are given of each variety as well as several others considered of commercial importance. Variation within the variety is discussed.—*I. J. Condit.*

554. SHAMEL, A. D. **Some effects of shading lemon trees.** Month. Bull. California State Comm. Hort. 7: 441–451. *4 fig., 8 tables.* July, 1918.—Seventy-six lemon trees were enclosed in tent of tobacco cloth in a grove at Corona, California. Records of wind velocity, air temperature, air humidity, soil moisture and fruit yields were kept, both within and without the tent. The average wind velocity and humidity were lower inside the tent. The average temperature of the air was slightly higher inside the tent than outside, but the relative humidity was slightly lower inside the tent. The moisture content of the first 3 feet of soil inside the tent was higher than that of the comparative soil area outside. In the second 3-foot layer the soil moisture was practically the same within and without the tent.—The trees under the tent seemed to bring a larger proportion of their fruit to maturity in the winter and fall months. The difference in total production was only slightly greater under the tent, but the trees produced a higher proportion of green fruits.—*H. S. Reed.*

555. SHAMEL, A. D. **Why navel oranges are seedless.** California Citrograph 3: 204. July, 1918.—Popular.

556. SHARPLESS, B. H. **History of the Sharpless and the Monroe avocados, and my observations and experiences in propagating the same.** Ann. Rept. California Avocado Assoc. 1917: 26–28. April 30, 1918.—A short account of the history, bearing qualities, and the writer's success in propagating the two varieties is given.—*I. J. Condit.*

557. SHEDDEN, THOMAS H. **Practical ideas for popularizing the avocado.** California Citrograph 3: 54. Jan., 1918.—Popular.

558. SHEDDEN, THOMAS H. **How shall we eliminate the misnomer "Alligator Pear?"** Ann. Rept. California Avocado Assoc. 1917: 41–43. April 30, 1918.—Popular.

559. SPINKS, W. A. **Interplanting and changing varieties.** Ann. Rept. California Avocado Assoc. 1917: 44–48. 1918.—The writer suggests a plan for planting two or four varieties of avocados in the same orchard in such a way that the poorer varieties can be removed at any time, leaving one for the permanent planting. Four methods of top-working are discussed, namely—grafting into stubs in February; budding into the base of sprouts forced out for the purpose; budding directly into the bark of the trunk or main branches; budding into the old bark of stubs just as the new shoots start.—*I. J. Condit.*

560. STEWART, MRS. MARGARET. **My experience in growing avocados.** Ann. Rept. California Assoc. 1917: 63–66. April 30, 1918.—Popular.

561. TAFT, C. P. **The Taft avocado and its history.** Ann. Rept. California Avocado Assoc. 1917: 55–56. April 30, 1918.—A short account of the history and characteristics of the variety.—*I. J. Condit.*

562. TRIBBLE, CLAUDE. **Caprifying the Smyrna fig.** California Cultivator 51: 7. July 8, 1918.—Popular.

563. TRIBBLE, C. D. **The pistache in California.** California Cultivator 50: 68. *1 fig.* Jan. 19, 1918.—*Pistacia vera* is said to be a dry-land tree and should prove well adapted to

the foothills of California. *P. chinensis* which has been used for a stock is slow growing and dwarfs the more rapidly growing *P. vera* grafted on it. Directions for growing the seedlings, budding and grafting the stocks, and planting the trees are given. The best varieties are the Trabonella and Red Aleppo.—*I. J. Condit.*

564. VOSBURG, E. D. **Avocado varieties in Florida.** Ann. Rept. California Avocado Assoc. **1917**: 24–26. April 30, 1918.—The question of varieties is an important problem in Florida, as in California. Of the 500 acres of budded groves in Florida, upward of 90 per cent consist of the Trapp variety. The first trees of the Guatemalan type bore in Florida in 1912 and budwood of many varieties has been introduced. The Fuerte, Taft, Taylor, Murrieta, and Beardslee are reported as having fruited. In Florida the Guatemalan varieties mature from one to three months earlier than the same varieties in California. Trees of the Mexican type have withstood temperatures of 20° and are therefore attracting some interest.—*I. J. Condit.*

565. WAGNER, C. F. **The Wagner, Lambert, and Surprise avocados.** Ann. Rept. California Avocado Assoc. **1917**: 28–29. April 30, 1918.—Short account of the origin and fruitfulness of the three varieties.—*I. J. Condit.*

566. WEBBER, H. J. **Cold resistance of the avocado.** Ann. Rept. California Avocado Assoc. **1917**: 49–51. 1918.—This article sums up the information received by the writer from fifty replies to a questionnaire sent to members of the Association. The following factors influencing injury are briefly discussed: age of tree; condition of growth; constitutional condition; and time when irrigated. Notes are given on the comparative hardness of varieties.—The following table of temperature endurance was prepared from the data collected:

30°F.—Nothing injured as far as could be observed.

29°F.—No injury of account; only traces on most tender growth of West Indian and Guatemalan varieties.

28°F.—New foliage scorched on Guatemalan types; West Indian varieties showing considerable foliage damage.

27°F.—Mexican varieties, with new tips slightly scorched; Guatemalan, with almost all new foliage injured; West Indian badly damaged.

25°F. to 26°F.—Mexican varieties, with new foliage injured but some dormant trees uninjured; all Guatemalan sorts, with new foliage badly injured, and some old foliage scorched.

24°F.—Some dormant Mexicans uninjured; Guatemalan varieties badly injured, small limbs frozen back.

21°F.—All Guatemalan types killed to bud; a few of hardest Mexicans, such as Knowles and San Sebastian, with young leaves only, injured.—*I. J. Condit.*

567. WEBBER, H. J. **Work and aim of the citrus experiment station.** California Citrograph **3**: 134. May, 1918.—The new Citrus Experiment Station and Graduate School of Tropical Agriculture at Riverside was dedicated March 27, 1918. Dr. H. J. Webber, Dean and Director of the station set forth its function as two-fold, investigation and instruction, and illustrated its work by an account of the experiments conducted by the old citrus experiment station in Riverside to determine the value of various elements in soils, the best kind of fertilizer, the worth of cover crops, and the suitability of various root stocks. Some of the results of these experiments show that nitrogen is by far the most important of the ordinary elements used in citrus fertilization, that plots fertilized with stable manure are more thrifty and show less mottle leaf than plots treated with chemical fertilizer, and that cover crops increase greatly the fertility of the soil. To conduct these experiments and others in process the Experiment Station has built up a strong faculty of specialists in special divisions as chemistry, plant physiology, plant pathology, entomology, soil physics, plant breeding, and orchard management. Efficiency and seriousness of purpose characterize the spirit of the institution.—*L. W. Bartlett.*

568. WHITNEY, D. J. **Orange details: the matter of the June drop.** California Cultivator 50: 256. Sept. 14, 1918.—Popular.

569. WHITTEN, R. H. **Development of California's fig industry.** Pacific Rural Press 96[10]: 254. *1 fig.* Sept. 7, 1918.—Popular.

570. YOKUM, F. W. **Soil selection for fig growing and its treatment.** Fig and Olive Jour. 2[11]: 6. April and May, 1918.—Popular.

571. YOKUM, MRS. F. W. **Proper curing of the fig essential to the success of the industry.** Fig and Olive Jour. 3[2]: 9. July, 1918.—Popular.

572. ZOLLER, HARPER F. **Some constituents of the American Grapefruit. (Citrus decumana).** Jour. Ind. Eng. Chem. 10: 364. May 1, 1918.—A condensed historical sketch indicates introduction to U. S. A. via Mexico. The common claims as to medicinal value of G. are shown to be without proven foundation. Author is investigating the bitter principle identified as Naringin to demonstrate therapeutic value. Analysis of peel showed recoverable amounts of essential oil similar to orange oil, the glucoside Naringin ($C_{21}H_{26}O_{11}.4H_2O$) and pectin. Naringin is levorotatory (mol. rot. in $C_2H_5OH = -65.2$, 18°C.) cream colored monoclinic crystals, hydrolyzes to form mixture of rhammose and glucose. Naringin is considered of importance in differentiations of *C. decumana* from other citrus species. Grapefruit culls are regarded as a satisfactory source of commercial pectin, citric acid and possibly industrial alcohol. Naringin and pectin content increase during storage. Reducing sugars and sucrose increase.—*C. P. Wilson.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

573. MURPHY, PAUL A. **The morphology and cytology of the sexual organs of Phytophthora erythroseptica Pethyb.** Ann. Bot. 32: 115–153. *2 pl.* 1918.—A morphological and cytological study of the peculiar type of sexual reproduction which had been described by Pethybridge as based upon his observations on living or fresh material. Author describes in detail his cultural and staining technique. The antheridia and oogonia arise from different hyphae but the fungus is homothallic. The antheridium is first formed and is then pierced by the developing oogone which is, however, fully formed only after passage through the antheridium. There is a conspicuous degeneration of the nuclei present in both sexual structures before any nuclear division takes place. The remaining nuclei increase in size and become aggregated into a hollow sphere with a single nucleus lying in the center. The nuclei of this sphere now divide and it was possible to note all stages up to telophase when the degeneration of these nuclei takes place. The chromosome number was found to be four or six. At this time there appears a structure protruding from the oogonium into the antheridium. This corresponds in part to what has been called the receptive papilla by workers on related forms but for which the author suggests the term "manocyst." This persists for some time after the central nucleus has divided and after the migration of one of these sister nuclei to the periphery, when it disappears with the formation of the fertilization tube which here is a part of the oogonium. Only a single nucleus enters the oogone and comes to lie close to the female nucleus, but fusion of the male and female nuclei does not take place until after the formation of the three layers of the oospore wall. The cytology of the oospore following the sexual fusion was not studied. The entire study indicates a very close relationship of Phytophthora to Pythium, Sclerospora and Plasmopara. [See Bot. Absts. 1, Entry 1587.] —*E. M. Gilbert.*

574. Ericksson, Jacob. **Développment primaire du mildiou (Phytophthora infestans), au cours de la végétation de la pomme de terre. [Primary development of Phytophthora infestans and its course in the tissues of the potato.]** Rev. Gén. Bot. **29**: 257–260, 305–320, 333–349, 376–380; **30**: 16–30, 50–62. *6 pl., 5 fig.* 1918.—This series of papers is divided into four parts, the first of which is given over to a résumé of the earlier views of such men as Berkeley, Kuhn, de Bary, Wilson, Smith, and others as to the methods of hibernation of the fungus. The second portion reviews the work of Clinton (1904–1910); Jones, Lutman, and Giddings (1904–1910); Pethybridge and Murphy (1911-1913); and Melhus (1912–1915). The author finds no satisfactory explanation in any of these studies and states the problem as one of discovering the actual method of hibernation, which he feels has been partly hinted at by Wilson and Smith; that is, there must be a plasmic latent phase found in the tuber itself. The remainder of the paper briefly gives the evidence based upon cytological studies and illustrated by microphotographs.

The author finds the first appearance of the disease indicated by characteristic spots on the mature leaves of the plant. These show a definite zonation; a dark central portion surrounded by a greyish velvety zone, outside of which is one of a pale green, rather distinctly set off from the normal green of the healthy leaf. Cytological studies of these areas show distinct evidence of an existing mycoplasmic condition in the tissues, first distinctly noted in the pale green layer where a number of small dark granules are found between the chlorophyll bodies. This is followed by a disintegration of the chlorophyll and the sudden appearance of several nucleoles. The granules and nucleoles now aggregate in various parts of the cell, giving the characteristic mycoplasmic condition described by the author in earlier papers. Hyphae are soon organized in the intercellular spaces of the velvety zone and are noted to be of two types; one female, giving rise to oogones, the other male, and producing antheridia. Oospores are found in the central area, often in groups. Instead of resting, as is usually supposed, they immediately germinate, sending the conidiophore through the stomata and soon producing the conidia, each of which produces eight zoospores. The entire process is probably completed in less than twenty-four hours.—*E. M. Gilbert.*

575. Campbell, D. H. **Studies on some East Indian Hepaticae.** Ann. Bot. **32**: 319–338. *Pl. 8, 9. 10 fig.* 1918.—Two related genera of the Marchantiaceae, Dumortiera and Wiesnerella, are considered. In Dumortiera the air chambers, which are so conspicuous a feature in typical members of the family, are partially or wholly suppressed. The author regards this suppression as secondary and associated with the hygrophilous habit of the species. In Wiesnerella air chambers are present, but the genus shows evidence of reduction in the simple pores of the female receptacle. In the region studied Dumortiera is represented by the following three species: *D. trichocephala*, widely distributed in the Indo-Malayan region and Oceanica; *D. velutina* known only from Java and Sumatra; and *D. calcicola*, a Bornean species proposed as new. Wiesnerella, on the other hand, is monotypic, its only species, *W. denudata*, being known from Java, the Himalayas, Japan and Hawaii. In *D. calcicola* the fertile thallus is characterized by a jointed appearance, produced by successive apical innovations. Both male and female receptacles are borne on the same plant, and both are apparently sessile. The sessile condition of the female receptacle, however, may be associated with the absence of fertilization, no capsules being present. The vegetative organs and the general features of the sexual receptacles are taken up briefly in both genera, greater emphasis being laid on the sexual organs and the sporophytes. In Dumortiera the development of the antheridium is essentially the same as in the other Marchantiaceae. The mature antheridium is distinguished by a conspicuous apical beak. The division of the spermatocytes is not diagonal as in Marchantia, and it is possible that it may be suppressed altogether. The development of the archegonium presents no distinctive features. The embryogeny of Dumortiera is described in detail, apparently for the first time. At maturity the seta elongates enough to enable the capsule to protrude completely. Dehiscence takes place by means of four somewhat irregular valves, which usually undergo secondary splittings. In its younger stages the sporophyte is comparable with that of Plagiochasma; in its later stages it is closer to those of Preissia and Marchantia, although the foot is less

clearly defined. Under Wiesnerella the epidermal pores, air chambers, ventral scales and rhizoids are briefly described, and the many points of agreement between the sexual receptacles and those of Dumortiera are emphasized. The archegonia are essentially the same in both genera and the sporophytes, as far as could be determined from late stages of development, present no striking differences. The ripe spores of Wiesnerella, however, are larger than those of Dumortiera and show wing-like ridges instead of small papillae on the surface. [See Bot. Absts. 1, Entry 1046.]—*Alexander W. Evans.*

576. Stewart, F. C. **Tubers within tubers of Solanum tuberosum.** Brooklyn Bot. Gard. Memoirs 1: 423–426. *3 fig.* 1918.—Author records cases of the development of large new potato tubers within old ones which had been stored over summer. He shows that these new tubers are formed on ingrowing sprouts and notes that they are similar to those previously described by Gager, except for being considerably larger.

577. Harris, J. Arthur. **Further studies on the interrelationship of morphological and physiological characters in seedlings of Phaseolus.** Brooklyn Bot. Gard. Memoirs 1: 167–174. 1918.—A continuation of author's studies on relationship between morphological and physiological variations. Seedlings of Phaseolus which were somewhat abnormal structurally, in that they showed a slight vertical separation of the two cotyledons in their insertion on the axis, were grown each beside a normal seedling from the same seed plant, under similar environmental conditions. The primordial leaves and the first trifoliate leaf of the abnormal plants both produced a decidedly smaller weight of green leaf tissue and of dry substance than the corresponding leaves of normal plants. The percentage of dry weight produced in the leaves is also lower in the abnormal seedlings, but the difference between the two groups is much less marked than in the previous cases. Author concludes that plants with morphological abnormalities are also abnormal physiologically. [See Bot. Absts. 1, Entry 884.]

578. MacDaniels, L. H. **The histology of the phloem in certain woody Angiosperms.** Amer. Jour. Bot. 5: 347–378. *Pl. 24–29.* 1918.—Records the results of a detailed comparative investigation of the structure of the phloem in 54 species of woody plants selected from 21 families of Dicotyledons. The author criticises the work of Hemenway and discusses the phylogenetic significance of the various types of vessels and sieve tubes with reference to the conservatism of seedlings and first annual rings. He states that there is no fundamental difference in type between sieve tubes in seedlings and in mature plants, but that in the former the sieve tubes are smaller and relatively less numerous than in the latter. The phloem of seedlings is very similar to that of one-year-old twigs. Companion cells are present in all families studied. There is little correlation between type of vessel and type of sieve tube. The sieve tubes of the lower woody Dicotyledons are fundamentally different from those of gymnosperms and vascular cryptogams. Widely different types of sieve tubes are found in species of the same family and even of the same genus, and there seems to be no gradual advance in sieve tube type which parallels our present ideas of phylogeny. The author concludes that in such a case as this, evidence from anatomy will be of phylogenetic significance only when gathered in great abundance and from a very wide range of forms.

579. Sinnott, Edmund W. **Conservatism and variability in the seedling of dicotyledons.** Amer. Jour. Bot. 5: 120–130. *4 fig.* 1918.—As a result of a study of seedling anatomy the author emphasizes the conclusion that a delimiting of certain stages in ontogeny as retentive or recapitulatory of ancestral features, in their entirety, cannot successfully be made. The study of more than 250 species belonging to 86 families has confirmed the observations of others as to the extensive variability of seedling structure in many respects. The structure of the cotyledonary node, however, is found to be remarkably uniform throughout large plant groups. The primitive type of leaf trace in ferns and seed plants has been shown to be a double one, or one consisting of an even number of strands. In dicotyledons, the author finds that although an odd number of veins is characteristic of all cotyledons (as

of foliage leaves), a feature evident externally in the strong midvein, it has arisen by a fusion of the two median bundles of the ancient type; and that the cotyledonary traces of all dicotyledons retain the ancestral condition, the median trace, single and central in the blade, being a double bundle in its origin. The relation between the vascular systems of the hypocotyl and the epicotyl, and the number of gaps caused by the departure of the cotyledonary trace, were also found to be very constant, as was the type of venation of the cotyledon. "The seedling of dicotyledons is therefore variable in certain of its characters and conservative in others, thus emphasizing the importance of studying conservatism and variability in connection with particular characters rather than with particular organs or regions."—*A. J. Eames.*

580. SINNOTT, EDMUND W. **Factors determining character and distribution of food reserve in woody plants.** Bot. Gaz. 66: 162–175. *2 fig.* 1918.—Gives the result of an extensive survey of the distribution of fat and starch in the stems (chiefly twigs and young branches) of woody plants at different seasons of the year. During the winter, starch was found to be most abundant in regions remote from centers of conduction and in cells with thick, well lignified, or small-pitted walls; fat, near the phloem, close to vessels, or in cells with thin or unlignified walls or large pits. The author suggests that the ease with which water or substances carried in water have access to the cell is probably a determining factor, and that "differences in the type of food reserve may be due to differences in water content of the various storage cells, resulting in modification of enzyme activity, or differences in the ease with which enzymes have effective access to the storage cells."—*I. W. Bailey.*

581. LANGDON, LADEMA M. **The ray system of Quercus alba.** Bot. Gaz. 65: 313–323. *22 fig.* 1918.—The author gives a snyopsis of previous papers on the origin and interrelation of the various types of medullary ray in the wood of the Angiosperms, discusses these theories briefly and states the results of her study to obtain evidence bearing, not directly on the comparative morphology of ray types, but on the effect of growth conditions, position in tree, age of tree, etc. *Quercus alba* was studied intensively, material from various parts of three trees of different age and vigor being worked over. The conclusion is drawn that the ray system is not appreciably affected by the age or vigor of the tree or of the branch, or by location in the tree. Decreasing vigor of growth in mature wood, however, brings about progressively later and later appearance of multiseriate rays. This type of ray in seedlings and in the first annual ring was found to occur only in the region of departure of lateral leaf traces. The statements of previous writers that the infiuence of these traces is responsible for the form of the stele in oak stems,—five depressed segments alternating with five raised portions—are confirmed and elaborated. [See Bot. Absts. 1, Entry 1154]—*A. J. Eames.*

582. NOTHNAGEL, MILDRED. **Fecundation and formation of the primary endosperm nucleus in certain Liliaceae.** Bot. Gaz. 66: 143–161. *Pl. 3–5.* 1918.—The chromatic phenomena attending fertilization and early endosperm formation in *Trillium grandiflorum* and *Lilium Martagon* have been investigated by the author. A brief history of double fertilization and triple fusion is given and attention is called to the fact that in no case have the chromatin changes in the first division following the contact of these fusing nuclei been carefully worked out for the Angiosperms. In *Trillium grandiflorum* the nuclear membranes separating the egg and sperm disappear and the nuclear content of the two is surrounded by a common membrane; the male and female chromatin do not fuse, and remain distinguishable up to the time of their arrangement on the equatorial plate. In both genera studied the chromatin of the three nuclei, which take part in the so-called triple fusion, remains distinct up to the formation of a typical bipolar spindle. One nucleus in the third division of the endosperm nuclei in *Trillium grandiflorum* showed three distinct groups of chromatic segments consisting of six chromosomes each.—*Margaret C. Ferguson.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

[Unsigned abstracts are by the editor.]

583. ARBER, A. N. **A note on submedullary casts of coal-measure calamities.** Geol. Mag. 5: 212–214. Dec. 6, 1918.—A short note pointing out the confusion originating from attempts to identify supposed pith casts of various *Calamites* which were in reality not true pith casts but incrustations of surfaces external to the pith, but not actually natural exterior surfaces. The name "sub-medullary" casts is suggested for them, and the conclusion drawn that they should be considered as specifically indeterminable.—*M. C. Stopes.*

584. BAILEY, I. W., AND W. W. TUPPER. **Size variation in tracheary cells: I. A comparison between the secondary Xylems of vascular cryptogams, gymnosperms and angiosperms.** Proc. Amer. Acad. Arts Sci. 54: 149–204. 1918.—This is the first paper giving the results of a comparative study of the secondary xylem, more especially the tracheary elements, of vascular plants. The tabulated results are extensive and of great value to comparative anatomists, and the relationship between size of the elements and the stage of evolution of the different groups appears to be of definite phylogenetic value. It is shown that the tracheary elements in the so-called vascular cryptogams are very long, whereas among the gymnosperms belonging to the cordaitalen and cycadophyte alliances they approximate more or less those of the cryptogams, while the Gnetales on the other hand resemble the conditions found among the angiosperms. Among the latter, with the exception of the Trochodendraceae and Magnoliaceae, the elements are relatively very much shortened. In all dicotyledons and gymnosperms except Cordaitales and Cycadophyta the first formed tracheary cells of the secondary wood are relatively short and actually shorter than the adjoining elements of the primary wood or the subsequently formed elements of the secondary wood. This is in marked contrast to what prevails in the lower vascular plants which possessed relatively wide zones of primary wood. A second tendency toward reduction in length appears to have resulted from the evolution and differentiation of vessels. That the specialization concomitant with evolution resulted in shortening is indicated not only by the comparison between cryptogams and gymnosperms, but also by the similarity in this respect between angiosperms and the gnetalean gymnosperms and by the unusual length of the tracheids in the vesselless angiosperms Trochodendraceae, Drimys, etc. Certain correlations are also traced to other factors, as shown by the shorter elements in the slow growing and slender stemmed conifers (Taxaceae, Cupressaceae) and in the larger elements in the larger and more rapidly growing conifers. The effects of dwarfing and depauperation within a species shows in the shortening of the elements; and shortening is also recorded for regions where tissue adjustments are taking place as at the junction of root and stem, branches, wounds, compression wood, etc. There appears to be no absolute correlation between body size and cell size. [See Bot. Absts. 1, Entry 998.]

585. BERRY, EDWARD W. **Notes on the fern genus Clathropteris.** Bull. Torrey Bot. Club 45: 279–285. *2 t. f.* 1918.--Describes an exceptional specimen of *Clathropteris platyphylla* (family Dipteriaceae) from the upper Triassic near Richmond, Virginia, and gives a restoration involving a new interpretation of the frond habit.

586. BERRY, EDWARD W. **A restoration of Neocalamites.** Amer. Jour. Sci. 45: 445–448. *2 fig.* 1918.—Discusses the genus Neocalamites which represents descendents from the Paleozoic Calamites recently found to be not uncommon in the older Mesozoic rocks. A restoration is given and described of *Neocalamites knowltoni*, a striking form from the upper Triassic near Richmond, Virginia.

587. HICKLING, G. **A contribution to the micro-petrology of coal.** Trans. Inst. Mining Engineers 53^{3}: 137–158. *Pl. I–IV.* 1918.—The author points out that it is scarcely an

exaggeration to say that no rock in the Earth's crust is less understood than coal. Without going into previous literature, the author makes several observations on "dull" and "bright" layers of coal, discusses "streak" and "mother of coal" and other points. In conclusion, he classifies coal in three groups: (1) Humic, (2) Cannelloid, (3) Bogheads.

The value of the paper chiefly lies in its excellent colored illustration of coal sections, showing woody tissue, and its other good micro-photographs.—*M. C. Stopes.*

588. KNOX, G. **Some notes on the origin and composition of coal.** Proc. S. Wales Inst. Engineers **34**: 32–77. *Pl. VI.* 1918.—A semi-popular address, well illustrated, largely embodying the results of research work already published by many authors without references to the literature of the subject.—*M. C. Stopes.*

589. KRYSHTOFOVICH, A. N. **On the Cretaceous Age of the "Miocene Flora" of Sakhalin.** Amer. Jour. Sci. **46**: 502–510. Sept., 1918.—A considerable fossil flora was described from the Island of Sakhalin in 1878 by Oswald Heer, who determined its age to be Miocene and it has been so considered since that time. The author explored the region in 1917 and demonstrates that Heer's materials were partly Cretaceous and partly Tertiary which were unintentionally mixed by the collectors of 1878. Kryshtofovich announces three series of beds below the true Tertiary—an Upper Cretaceous Orokkian series, a Middle Cretaceous Gyliakian series and a Lower Cretaceous Ainuian series—all plant bearing, especially the middle series which contains many forms common to the Atane beds of Greenland, the Raritan and Magothy formations of the Atlantic Coastal Plain and the Dakota sandstone of the western United States. The problem of the place of origin of the flowering plants is bound up in the study of Cretaceous floras. That they originated on one of the land masses of the Northern Hemisphere is now conceded, but the lack of any Asiatic records has heretofore been a most serious gap in the available records. The present paper is a preliminary abstract as much of the collected material was inaccessible in Petrograd at the time it was written in Tokyo. More exhaustive studies should yield results of the greatest importance.

590. KRYSHTOFOVICH, A. **On the Cretaceous flora of Russian Sakhalin.** Jour. Coll. Sci. Imp. Univ. Tokyo. 40^{3}. 73. *15 fig.* 1918.—A partial elaboration of the flora mentioned in the previous abstract from the Cretaceous of Sakhalin, formerly thought to be of Tertiary age. This flora is remarkable for its cosmopolitan character and contains many forms common to North America, Europe and the Arctic. New species are described in *MacClintockia, Celastrophyllum, Aralia, Stenopteris, Dicksonia* and *Gleichenia.*

591. SAHNI, B. **On the branching of the zygopterideau leaf, and its relation to the probable "pinna" nature of Gyropteris sinuosa Goeppert.** Ann. Bot. 32: 369–379. *3 fig.* 1918.—A detailed consideration of the course and significance of the pinna traces, particularly in relation to Bertrand's views. The suggestion is revived that *Gyropteris sinuosa* Goepp. is a secondary rachis of a form like *Metaclepsydropsis* or *Diplolabis.*—*M. C. Stopes.*

592. SCOTT, D. H. **Notes on Calamopitys, Unger.** Jour. Linn. Soc. London, Bot. **43**: 204–232. *1 fig. 2 pl.* 1918.—The author presents additional evidence of the course of the leaf trace and is mainly concerned with a re-examination and more complete description of the five known species of Calamopitys, a somewhat anomalous type coming from the upper Devonian and Lower Carboniferous of Europe and North America. The relationships are discussed and the known species are considered to represent a natural series and not yet capable of generic segregation. Their nearest affinity is held to be with the Lyginopteriaceae among the Pteridospermophyta through the genus Heterangium, and the two species *C. fascicularis* and *C. Beinertiana,* for which Zalessky proposed the new genus Eristophyton, are admitted to show structural advances in the direction of the Cordaitales.

593. SCOTT, D. H. **The structure of Mesoxylon multirame.** Ann. Bot. 32: 437–457. *2 fig., pl. 11–4.* 1918.—In continuation of former studies the author gives an account of the species *Mesoxylon multirame* from the English Coal Measures—the genus Mesoxylon being a type of

Cordaitales differing from the normal in the presence of centripetal xylem in the stem. In the present species this persists as long as the two strands of the leaf trace remain distinct. The only important difference from the previously described *M. poroxyloides* is in the course of the leaf traces—a specific distinction, and in the organisation of the axillary steles—probably a functional adaptation. It differs from *M. Sutcliffii* and *M. Lomaxii* primarily in the structure of the inner zone of the wood and from the latter in the course of the bundles. Points of general interest are the presence of tangential pits on some of the tracheides and the occasional presence of xylem parenchyma; the probably resiniferous secretory sacs, sieve tubes and parenchyma arranged more or less concentrically to form the phloem; the lateral connections of the axillary stele and its frequent division in passing inward; the distichous branching of the axillary shoots; and the branches with scale leaves or bracts. Further studies of these most important Paleozoic types are promised.

594. Stopes, M. C. **New Bennettitean cones from the British Cretaceous.** Phil. Trans. Roy. Soc. London B208: 389–440. *Pl. 19–24. fig. 1–25.* 1918.—This is a detailed morphological and anatomical account of the fructification of a new species of Bennettites (*B. Albianus*); and also the first detailed account of *Bennettites maximus*, described many years ago from externals only by Carruthers. The new species is particularly interesting, because it is the first petrified remains of the group which has been found in the Gault of Great Britain, and also beause the cone is immensely larger than any hitherto described from any other horizon and contains innumerable small seeds. These are most beautifully petrified, and some of their details can be made out more perfectly than in any other species of *Bennettites* hitherto described.

The diagnosis given is as follows:

Fruit: Ovulate cone, not less than 70 mm. in diameter and probably much more.

Seeds: Innumerable, 600 or more in a single transverse section; five-ribbed, much elongated, torpedo-shaped, 5–6 mm. long, and about 1.2 mm. in greatest diameter. Seed with many-layered integument, enclosed in cupule-like extension of tubular cells of the stalk. Micropyles blocked by plug of nucellar tissue. Inter-seminal scales completely mutually fused round apex of seed and with seed tissues.

Embryo: With two cotyledons; radicle and hypocotyl relatively massive.

Scales: Externally covered by well-marked "plastid-layer" which runs round collar of micropyle.

Horizon: Gault (Albian).

This new species throws light on a variety of morphological points. *Bennettites maximus* shows various features of vegetative interest and also has extremely young cones, so young apparently that the male organs were not yet unfolded, and in the female cone were mere rudiments of the ovules. The species is re-diagnosed; and both are fully illustrated with text figures and photographic plates.—*M. C. Stopes.*

595. Stopes, M. C., and Wheeler, R. V. **Monograph on the constitution of coal, based on a paper read before the London Section of the Society of Chemical Industry.** Pub. by H. M. S. Stationery Office for Dept. Sci. Industr. Research. 58: — — —. *Pl. 1–3.* 1918.—In small print and condensed form, this paper embodies the most complete chemical and palaeobotanical consideration of the composition of Bituminous Coal hitherto available. It is accompanied by a full bibliography, and endeavours to present in due proportion all the more important work hitherto done which bears on the actual constitution of coal—as distinct from its geological accumulation. The headings of the contents table are as follows: Definiton of Coal; General Constitution of Coal; Accumulation of Coal-forming Material; The Action of Solvents; Destructive Distillation; Distillation at Different Temperatures; Liquid Distillates; Microscopical Evidence on the Constitution of Coal, (1) Earlier work, (2) The present research; "Ulmic Substances;" The Action of Reagents; Artificial Coals; Theories; Appendix, on Classification; Bibliography.—*M. C. Stopes.*

596. WALKOM, A. B. **The geology of the Lower Mesozoic rocks of Queensland, with special reference to their distribution and fossil flora, and their correlation with the Lower Mesozoic rocks of other parts of Australia.** Proc. Linn. Soc. N. S. Wales. 43: 37–115. *6 fig. 2 pl.* 1918.—The Lower Mesozoic rocks comprise the Ipswich, Bundamba and Walloon-series, the first two being of limited extent and the last probably of much wider extent. The bulk of the coal produced in Queensland comes from the Ipswich with subordinate beds in the Walloon and sandstones of the latter yield artesian waters. The Lower Mesozoic is estimated to be from 15,000 to 17,500 feet in thickness and is considered to be almost entirely of continental origin. The fossils are exclusively plants in the Ipswich and Walloon and insects in the former—the Bundamba series being unfossiliferous. The Ipswich is definitely referred to the late Triassic and is considered as possibly of Rhaetic age, while the Walloon series is referred to the Jurassic and its flora is compared with Liassic and lower Oolitic floras of other regions. The Lower Mesozoic was a time of similar anomalous continental deposits in other parts of Australia, as well as in India and South Africa, and their respectve floras are of the greatest importance to students of the evolution and migrations of floras. The author discusses the geological history of the region which he illustrates by a series of paleogeographic maps covering the period between the close of the Paleozoic and the dawn of the Cretaceous.

597. WALKOM, A. B. **Mesozoic floras of Queensland. Part II. The flora of the Maryborough (marine) Series.** Queensland Geol. Surv. Publ. 262. *21 p. 2 pl.* 1918.—The paper has a short introductory geological note by the Chief Government Geologist (Mr. B. Dunstan). Some 14 species are described, mostly from fragmentary specimens. They come from the Maryborough Marine Series which are generally regarded as of Lower Cretaceous Age, equivalent to the Rolling Downs Series of Western Queensland. There is no doubt that the plants occur in the marine beds as in some cases they are on the same specimen as marine shells.—*M. C. Stopes.*

PATHOLOGY

DONALD REDDICK, *Editor*

[Unsigned abstracts are by the editor.]

598. ANDERSON, PAUL J. **Rose canker and its control.** Massachusetts Agric. Exp. Sta. Bull. 183: 11–46. *Pl. 1–3, 11 fig.* May, 1918.—A monographic treatment on the canker of roses caused by *Cylindrocladium scoparium* which has become serious on greenhouse roses in America. Experiments mostly on the life history of the fungus and control of the disease.—Another species of the same genus, *C. parvum* n. sp. is common on roses but a saprophyte.—Recommendations for control (1) selection of disease-free plants, (2) disinfection of pots, soil, benches, tools, etc., either by steam (over 50°C. for 10 minutes or more), hot water, or formaldehyde (at rate of 1 pint to 25 gallons and 2 gallons of the dilute solution per cubic foot of soil).—*P. J. A.*

599. BALLARD, W. R. **Strawberry notes.** Maryland Agric. Exp. Sta. Bull. 211: 51–76. Jan., 1918.—The relation of yield to percentage of stand is graphically shown. The degree of resistance to mycosphaerella leaf-spot is noted for 55 varieties.—*J. B. S. Norton.*

600. BLAKE, M. A. **Some important points in fruit growing.** Rept. Maryland Agric. Soc. 2: 109–117. Mar., 1918.—Gives recommendations for control of peach diseases due to Exoascus, Cladosporium and Sclerotinia, and the results of dusting trees in New Jersey.—*J. B. S. Norton.*

601. BRANDES, E. W. **Anthracnose of lettuce caused by Marsonina panattoniana.** Jour. Agric. Res. 13: 261–280. *4 fig. Pl. C, 20.* April 29, 1918.—The disease described is said to occur chiefly on greenhouse lettuce and its development is favored by the conditions under

which it is grown. A brief summary of previous investigations is followed by an account of the present known distribution of the fungus, which is found in Europe as well as the United States. The symptoms and etiology of the disease are described. Inoculation experiments show that infection occurs in cool weather rather than in hot weather. Relation of moisture and dissemination of the organism is discussed. The trash from a previously diseased crop is regarded as the chief agent in carrying the disease over from year to year. The disease is spread in greenhouses by splashing of water in watering of plants. Sanitary methods such as destruction of trash of a preceding crop, rotation in the field and avoidance of manure containing lettuce refuse are recommended to reduce disease. Splashing of water from plant to plant or leaf to leaf is also to be avoided. Good ventilation is desirable. Spraying with Bordeaux mixture is only recommended as a last resort. [See Bot. Absts. 1, Entry 391.]—*C. L. Shear.*

602. Brooks, Charles, and D. F. Fisher. **Irrigation experiments on apple-spot diseases.** Jour. Agric. Res. 13: 109–137. 1918.—The writers give the distinguishing characteristics of bitter pit, Jonathan spot, drouth spot, cork, blister and rosy aphis stigmonose. Detailed irrigation experiments are reported on bitter pit and Jonathan spot. Heavy irrigation greatly increased the amount of bitter pit. Medium irrigation followed by heavy late in the season resulted in more of the disease than continuous heavy irrigation. Heavy irrigation followed by light gave less bitter pit than light irrigation throughout the season. Large apples had more bitter pit than smaller ones but heavy irrigation increased the disease practically as much on small and medium sized apples as on large ones. Irrigation had but little influence on Jonathan spot. Observations are reported indicating that drouth-spot is due to sudden and extreme drouth and that cork, and blister are drouth effects confined to certain peculiar soil areas. [See Bot. Absts. 1, Entry 58.]—*Charles Brooks.*

603. Brown, Nellie A. **Some bacterial diseases of lettuce.** Jour. Agric. Res. 13: 367–388. *Pl. E, 29–41.* May 13, 1918.—Two bacterial diseases of lettuce are described as new in this paper; one found in South Carolina and Virginia, the other on greenhouse plants in Kansas. Isolation and inoculation experiments with both organisms are described in detail, also the relation of the organism to various media and temperature as well as moisture. The organism from South Carolina and Virginia lettuce is described as *Bacterium vitians* n. sp. The organism producing the disease on greenhouse lettuce from Kansas is described as *Bacterium marganale*, n. sp. This affects the margins of the inner whorl of leaves of immature plants chiefly. Subirrigation and good ventilation are the chief means recommended in preventing this disease.—*C. L. Shear.*

604. Bryan, C. E. **How many applications of spray material can be applied profitably in developing a peach crop?** Rept. Maryland Agric. Soc. 2: 92–102. Mar., 1918.—Spraying five times cost 30 cents per tree, and an increase of half a basket per tree paid the entire expense. —*J. B. S. Norton.*

605. Coons, G. H. **Seed tuber treatments for potatoes.** Phytopath. 8: 457–468. *6 fig.* 1918.—Field experiments to test the relative value of new and old methods of treating potato tubers for the control of scab (Actinomyces) and scurf (Rhizoctonia). There is no record that potatoes had been grown previously on the land. Untreated, scabby seed stock yielded low grade scabby (38 per cent) tubers; untreated seed stock free from scab yielded a good grade of tubers with 12 per cent scab. Scabby seed stock dipped in formaldehyde solution 1 : 240 for 15 minutes and 1.5 hours yielded a good grade of tubers with 0.7 and 1.1 per cent scab respectively, while seed stock free from scab and subjected to the same treatments yielded good tubers with 0.1 and 7.4 per cent scab, respectively. (The latter percentage is thought to be the result of an error.) Sprinkling seed stock with formaldehyde, 1 : 240, gave excellent control of scab and the method gives promise of practical application.—Bleaching powder, 5 per cent solution did not prove particularly effective in controlling scab.—Treatments for scurf with formaldehyde solution in the above-named dilutions and for the same

lengths of time and with mercuric chlorid, 1 : 1000, for 0.5 and 1.5 hours indicate that the latter material at either interval is more effective (the longer interval seems to have reduced the stand) but the percentage of scurf in the progeny from untreated scurfed seed stock is only 14.—Selection of seed stock free from sclerotia of Rhizoctonia yielded a progeny free from scurf.—Spraying scabby seed stock with concentrated formaldehyde, 15 cc. per bushel, gave control of scab but the "stand" was reduced, apparently by the treatment. Likewise treatment with hot (54° at start) mercuric chloride, 1: 1000 for 5 minutes, gave control of scab and scurf but there seems to have been a reduction in "stand" from the treatment.—The organisms causing these two diseases apparently are introduced largely if not entirely on seed stock.

606. CORY, E. N. **Control of insects and diseases of fruits and vegetables.** Maryland Agric. Extens. Service Bull. 11. Feb., 1918.—A spray calendar.—*J. B. S. Norton.*

607. DOIDGE, E. M. **Potato diseases: V. Bacterial wilt or Vroptootje. (Bacterium solanacearum Erw. Sm.)** S. Afric. Fruit Grower 4: 236. June, 1918. [Also published as Bull. Local Series No. 49, S. Afric. Dept. Agric.]

608. DOIDGE, E. M. **Potato diseases: VI. The Rhizoconia disease of potatoes (Corticium vagum var. Solani Burt.).** S. Afric. Fruit Grower 5: 6. July, 1918.

609. EDSON, H. A., AND M. SHAPOVALOV. **Potato stem lesions.** Jour. Agric. Res. 14: 213–220. *Pl. 24–26.* July 29, 1918.—From isolation and inoculation experiments under greenhouse conditions several species of Fusarium as well as Alternaria, Botrytis, Sclerotinia, Zygorrhynchus, Corethropsis, Phoma, Clonostachys, and Acrostalagmus, are added to Rhizoctonia as causal organisms in the production of potato stem lesions, while several of the strains of Rhizoctonia tested were unable to attack the plants.—*H. A. Edson.*

610. ELLIOTT, CHARLOTTE. **Bacterial oat blight.** Phytopath. 8: 489–490. 1918.—Disease prevalent in north central states during a period of driving rains and cool weather. The plants were yellowish but resumed their normal blue-green color with the advent of dry, warm weather. Two diseases were observed the "halo" blight and "stripe" blight, but the former was by far the more common. The typical lesion of halo blight, when young, is an oval chlorotic area about a minute center of sunken dead tissue. The stripe blight lesion appears water soaked, somewhat translucent and usually extends as a long, rather narrow, sharply delimited streak between the veins. Absence of a halo and presence of glistening white flakes of exudate are diagnostic of streak blight.—Both diseases are caused by white bacterial pathogenes.

611. ELLIOTT, JOHN A. **Storage rots of sweet potatoes.** Arkansas Agric. Exp. Sta. Bull. 144: 1–12. *Pl. 1, fig. 1–10.* April, 1918.—Popular presentation describing principal storage diseases of the sweet potato with control measures, including construction and management of storage houses.—*J. A. E.*

612. ENLOWS, ELLA M. A. **A leafblight of Kalmia latifolia.** Jour. Agric. Res. 13: 199–212. *2 fig., pl. 14–17.* April 15, 1918.—A leafblight disease of mountain laurel found in Washington and vicinity is described. Brown areas are formed on the leaves which finally involve the entire plant. The causal organism was isolated from diseased leaves and the disease reproduced by inoculation experiments. Inoculation experiments with citrus, eggplant and apple gave negative results. The cultural characters of organisms in various media are given. The fungus is described as *Phomopsis kalmiae*, n. sp. [See Bot. Absts. 1, Entry 402.]—*C. L. Shear.*

613. FROMME, F. D. **An automatic spore trap.** Phytopath. 8: 542–544. *Fig. 1.* Oct. 1918.—One-half of a petri dish is attached to the shaft of the hour hand of a clock. Non-

nutrient agar is used. A frame work of thin metal strips set on edge, in the manner of a paddle-wheel, is forced into the solidified agar in the dish and divides its area into 12 sections. A metal cover, which fits over the rim of the clock case, has an aperture which exposes a sector equivalent to one-twelfth of the area of the dish.

614. GRAY, GEO. P. **Economic toxicology.** Science 48: 329–332. 1918.—Economic toxicology is that phase of toxicology that has to do with the relation of poisons to the control of pests detrimental to agriculture and to the public health.—History of the development of a chemical laboratory dealing exclusively with fungicides, insecticides, herbicides and "zooicides," their chemistry, manufacture and uses.—Description of a university course in the subject and an indication of the usefulness of treating the subject from the chemical standpoint.

615. GÜSSOW, H. T. **Drouth injury to McIntosh apple.** Phytopath. 8: 490–491. *Fig. 1.* 1918.—Fruit from British Columbia showed sunken, brown, lesions more or less confluent and irregular in shape and outline accompanied by vascular necrosis.—Very slight precipitation in the orchard from January to June 1917 is thought to be responsible.

616. GÜSSOW, H. T. **Observations on obscure potato troubles.** Phytopath. 8: 491–495. *5 fig.* 1918.—I. *Heterodera radicicola* on tomato roots in the greenhouse became established on potato tubers when a potato was planted in the same pot. Only female eelworms were observed. The wormy potatoes were planted and the progeny was free from attack.

II. *Unfavorable storage conditions.* In badly ventilated storage cellars potato tubers show numerous bluish-black warts about 5 mm. in diameter. The warts show plainly on peeling and consist of hard brown cells.

III. *Leaf streak.* Potato leaves show a network of dark brown lines following the leaf veins, with a similar color feebly diffusing into the surrounding tissues. Affected leaves turn yellow and die. At times lesions occur in the leaf stalk. Tubers show no lesions but those from affected plants reproduce the trouble when planted. Streaks are similar to those sometimes found on plants affected with mosaic but there is no connection between the two diseases.—No organism has been found.

IV. *Mosaic disease transferred by inarching.*—Mosaic of potato could not be transferred by contact but was transmitted by an inarched graft. The disease did not appear in the grafted plant but each of the four tubers produced by it developed typical mosaic.

617. HESLER, L. R. **Progress report on citrus scab.** Porto Rico (Federal) Agric. Exp. Sta. Rept. 1917: 30–31. 1918.—Preliminary report on the cause and control of citrus scab. Studies support the contention that the disease is due to the fungus *Cladosporium citri.* Copper and various sulfur and lime fungicides were employed in experimental groves. The opinion is expressed that treatment with lime-sulfur solution, supplemented by occasional applications of Bordeaux mixture, is worthy of thorough trial.—*L. R. Hesler.*

618. HODGSON, ROBERT W. **A Sterigmatocystis smut of figs.** Phytopath. 8: 545–546. Oct., 1918.—Badly infected figs can be detected by the discoloration of the outer skin. Mild cases are noted only on opening the fig when one or more streaks of a black gummy nature are observed. Ordinarily 3 to 10 per cent of the figs at Fresno, California, are affected, occasionally as high as 15 to 25 per cent. From artificial cultures and inoculations of pomegranate it is concluded that *Sterigmatocystis castanea* is the cause of the trouble. Some figs become infected while on the tree but it is thought that many are infected after they fall to the ground.

619. JOHNSTON, E. S. **Report on nut tree investigations in Maryland.** Maryland Agric. Exp. Sta. Bull. 218: 236–265. June, 1918. The death or survival of several hundred trees of *Juglans regia* and *Hicoria pecan* planted throughout Maryland in 1907–8 is tabulated, with notes on winter killing. Chestnut blight (*Endothia*) is reported in nearly all counties of the State.—*J. B. S. Norton.*

620. Johnston, John R. **Enfermedades y plagas del cacao en el Ecuador y metodos modernos apropiados al cultivo del cacao. [Cacao diseases in Equador and methods of cacao cultivation.]** [Review of: Rorer, J. B. Same title.] Phytopath. 8: 550. 1918.

621. Jones, Fred Reuel. **Yellow leaf blotch of alfalfa caused by the fungus Pyrenopeziza medicaginis.** Jour. Agric. Res. 13: 307–330. *6 fig. pl. D, 25–26.* May 6, 1918.—The yellow-leaf blotch of alfalfa has only been known in the United States for the past two years according to the author, but is quite widely distributed. It is also said to occur in Argentina and Europe. Notes on its economic importance are followed by a description of the disease. The causal organism, *Pyrenopeziza medicaginis*, the stages in its life history and the synonomy are discussed. The conidial condition is found to be *Sporonema phacidioides* Desm. Detailed descriptions of the morphology and physiology of the organism and of the production of apothecia in pure culture are given, also the behavior on various culture media. Inoculation experiments with both conidia and ascospores are described. It is concluded that infection appears to take place only from ascospores. The fungus over-winters on dead leaves. Cutting infested leaves before the perfect stage of the fungus is developed appears to hold the disease in check. Methods of sanitation are recommended as control measures. The removal of the dead leaves as a sanitary precaution is suggested.—*C. L. Shear.*

622. Lee, H. Atherton. **Early occurrence of citrus scab in Japan.** Phytopath. 8: 551. 1918.—Lesions of citrus scab [Cladosporium?] found on *Citrus nobilis* collected in 1863 in Japan.

623. Long, W. H. **An undescribed canker of poplars and willows caused by Cytospora chrysosperma.** Jour. Agric. Res. 13: 331–345. *Pl. 27–28.* May 6, 1918.—A canker of Populus and Salix is described as occurring in several Western states. The lesions are said to resemble sun-scald as it occurs on trunks of fruit trees. Pure cultures of the fungi were isolated from cankers and typical lesions of the disease produced by inoculating healthy plants. A description of pure cultures of the organism in the different culture media is given. The fungus is said to enter the host through wounds and dead branches. On poplars the disease in the Southwest is serious on trees growing at the outer limit of their range, also on trees planted on the streets and lawns, where they are subject to neglect and lack of water, also on trees that have been severely pruned, and in propagating beds. As control measures the selection of resistant species and an abundant water supply, with protection from mechanical injuries is recommended, also a careful inspection of nursery stock to avoid the distribution of disease. —*C. L. Shear.*

624. MacMillan, H. G. **Sunscald of beans.** Jour. Agric. Res. 13: 647–650. *Pl. 64–66.* June 17, 1918.—A spotting and streaking of bean pods and stems easily mistaken for bacterial blight is shown to be the result of sunscald. None of the varieties of beans observed was immune from the trouble which, though general in the district, is not destructive.—*H. A. Edson.*

625. Massey, Louis M. **The diseases of roses.** Trans. Massachusetts Hort. Soc. 1918: 81–101. *Pl. 1–2.* 1918.—Four diseases,—black spot (*Diplocarpon rosae*), powdery mildew (*Sphaerotheca pannosa rosae*), crown canker (*Cylindrocladium scoparium*) and crown gall (*Bacterium tumefaciens*)—are discussed in detail in regard to history and distribution, economic importance, symptoms, etiology, environmental relations and control.—Recommends application of powdered sulfur and arsenate of lead for the first two and soil disinfection, careful selection and sanitation for the last two. Author's treatment of crown canker about the same as in Phytopath. 7: 408–417; experiments described here for control of black spot and mildew the same as described in Phytopath. 8: 20–23.—*P. J. Anderson.*

626. Matz, Julius. **Some diseases of the fig.** Florida Agric. Exp. Sta. Bull. 149: 3–10. *Fig. 1–5.* Aug., 1918.—Anthracnose (*Glomerella cingulata*); Leaf blight (*Rhizoctonia micro-*

sclerotia); Fig rust (*Physopella fici*); Root-knot; Sclerotium blight (*Sclerotium rolfsii*); Limb blight (*Corticum salmonicolor*); Dieback; Dropping of fruit.—C. D. SHERBAKOFF.

627. NEWCOMER, A. **Will dusting produce as satisfactory results as spraying in developing a peach crop?** Rept. Maryland Agric. Soc. 2: 102–109. Mar., 1918.—It will, with both peach and apple.—*J. B. S. Norton.*

628. NORTON, J. B. S., AND C. E. LEATHERS. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull 216: 175–226. June, 1918.—The effects of hereditary defects and various environmental factors upon seed production are discussed in a general way and then in detail for each important crop and many minor crops. Special attention is given to seed diseases and seed disinfection, pollination difficulties and immature seeds. A bibliography of 347 titles is included. The results of experiments and observations are reported on the effect of cold, fermentation and fruit rot on tomato seed germination; disinfection of cabbage seed by chemicals and hot water; germination of immature tomato and cowpea seeds; germination of solanaceous seeds in manure; tomato seed production; and effect of fertilizers on tomato blooming. [See Bot. Absts. 1, Entry 747.]—*J. B. S. Norton.*

629. NORTON, J. B. S. [In: BALLARD, W. R., Strawberry notes.] Maryland Agric. Exp. Sta. Bull. 211: 74–75. Jan., 1918.—Notes on Mycosphaerella leaf-spot, Sphaerotheca and Botrytis diseases of strawberry, general disease control, and varieties resistant and susceptible to the leaf-spot.—*J. B. S. N.*

630. OSNER, GEORGE A. **Stemphylium leaf spot of cucumbers.** Jour. Agric. Res. 13: 295–306, *3 fig., pl. 21–24.* April 29, 1918.—The author describes a leaf spot of cucumbers found doing more or less damage in the vicinity of Plymouth, Indiana, and Bowling Green, Ohio. The spots vary in size and outline. The center is light, yellowish brown, surrounded by a reddish brown border, sometimes nearly white. The causal organism was isolated from these spots and its relation to the disease demonstrated by successful inoculations. Four varieties of cucumbers, two of gourd and two of squash were successfully inoculated. The disease is regarded as hitherto unpublished and the causal organism is described as *Stemphylium cucurbitacearum* n. sp. It is shown that high temperatures and a dry atmosphere are unfavorable to the development of the fungus. The organism lives over winter on diseased plants. Spores are disseminated by wind, rain, insects, etc. Preliminary experiments give promise that the disease may be controlled by Bordeaux mixture. Sanitary measures such as destruction of vines and crop rotation are recommended. [See Bot. Absts. 1, Entry 433.]—*C. L. Shear.*

631. PIERCE, ROY G. **Additional list of state and national quarantines against the white pine blister rust.** Phytopath. 8: 484–486. 1918.—Supplements and corrects original list given in: Phytopath. 7: 319–321. 1917.

632. PRATT, O. A. **Soil fungi in relation to diseases of the Irish potato in southern Idaho.** Jour. Agric. Res. 13: 73–100. *4 fig., pl. A-B.* April 8, 1918.—Fungi, including five new species of Fusarium isolated from desert soils are reported in detail. *Fusarium radicicola, Fusarium trichothecioides* and *Rhizoctonia solani*, known to be parasitic on the Irish potato, were isolated from Idaho soils known never to have been cropped with potatoes. The results of planting disease-free seed potatoes on cultivated lands never in potatoes, and on virgin desert land substantiate the opinion that land, previously cropped with such crops as alfalfa, clover, and grain, is better adapted to the production of disease-free potatoes than virgin desert land. [See Bot. Absts. 1, Entry 436.]—*H. A. Edson.*

633. RATHBUN, ANNIE E. **The fungus flora of pine seed beds.** Phytopath. 8: 469–483. 1918.—Species of Mucor, Penicillium, Aspergillus, *Rhizopus nigricans, Zygorrhynchus vuillemini, Trichoderma koningi* and some others were found at various depths from 1 to 44 in.

"With the exception of Fusarium no fungus known to cause damping off has yet been isolated from the soil of the nursery." The parasitism of "Fusarium" is not shown.—"Grubs and earthworms are carriers of the spores of soil fungi."

634. Reddick, Donald, and Vern B. Stewart. **Varieties of beans susceptible to mosaic.** Phytopath. 8: 531–534. Oct., 1918.—The common snap and shell varieties of *Phaseolus vulgaris* have been tested. Practically all are susceptible. White marrow is immune or highly resistant. The common Navy Pea is most susceptible but a pea bean, variety Robust, is found to be immune. Evidence is presented indicating that field selection of disease-free plants is not effective in eliminating the disease.

635. Reynolds, Ernest Shaw. **Two tomato diseases.** Phytopath. 8: 535–542. *2 fig.* 1918.—(1) Leaf chlorosis. Definite white areas or spots appeared on certain leaves of variety Bonny Best. The disease did not spread to other plants and only rarely did new leaves on affected plants develop the trouble. It could not be transferred to other plants by rubbing, and external applications of iron salts did not lessen it.—Theoretical discussion contains remarks on "the so-called mosaic disease." (2) Blossom end rot. Symptoms are described in detail. Attempts to find a causal organism failed. "It would not be surprising to find that several different and independent causes acting upon a uniform tissue, produce results of *generic* similarity and hence give rise to a group of diseases all at present included under one name."—Discussion of conditions of infection —Disease may be caused by an ultramicroscopic organism which infects at time of pollination.

636. Roberts, John W. and Leslie Pierce. **Apple bitter-rot and its control.** U. S. Dept. Agric., Farmers Bull. 938, 1918. *14 p., 3 fig.*—Gives a brief statement in regard to the occurrence, characteristics, and cause of bitter rot but is devoted largely to the questions of infection and control. The disease is reported to be carried through the winter in mummied apples, in bitter-rot cankers and in cankers in which the bitter-rot fungus is a secondary infection. In the Eastern States the disease seems to pass the winter largely in the mummies but in badly infected orchards of the Middle West, the cankers often surpass the mummies in importance. The spores are carried by rain drops, by insects and probably also by birds. In the average orchard in bitter-rot sections the disease can be controlled by three or four sprayings with Bordeaux mixture but in orchards where the disease has been very destructive for a number of years it is often necessary to remove the overwintering sources of infection in order to secure complete control. A list of apple varieties is given with reference to their relative susceptibility to bitter rot.—*Charles Brooks.*

637. Roberts, John W. **The sources of apple bitter rot infections.** U. S. Dept. Agric. Bull. 684: 1–26. *5 pl.* 1918.—A detailed report of orchard experiments is given and the following conclusions are drawn: Bitter rot is due to the fungus *Glomerella cingulata*. The mummies are the chief sources of infection; both those on the tree and those on the ground being important. The fungus appears to live over but one year in a mummy. In cankers on young, vigorous branches the fungus does not survive till the next season; in cankers on older twigs of susceptible varieties it may survive for several years. Different varieties of apples show different degrees of susceptibility to the cankers. The fruit of a variety may be susceptible to rot and the limbs practically immune to cankers. The fungus can be found in cankers and dead wood due to various causes. It is able to infect many plants other than the apple.—*Charles Brooks.*

638. Rosenbaum, J., and G. B. Ramsey. **Influence of temperature and precipitation on the blackleg of potato.** Jour. Agric. Res. 13: 507–513. June 3, 1918.—From a study of climological data and soil temperature records in correlation with outbreaks of the blackleg disease of the potato, caused by *Bacillus phytophthorus*, the conclusion is drawn that high temperature and low precipitation tend to diminish the severity of the disease, while low temperature and high precipitation favor its development. No evidence could be obtained

that the organisms overwinter in a virulent condition either in soil or buried tubers in Maine or in Virginia.—*H. A. Edson.*

639. SHEAR, C. L. **An outline of the history of phytopathology.** [Review of: Whetzel, Herbert H. (Same title.) Philadelphia, 1918.—See Bot. Absts. 1, Entry 377.] Phytopath. 8: 487–488. 1918.

640. SIEGLER, E. H. **A brief analysis of the dusting method.** Rept. Maryland Agric. Soc. 2: 86–98. Mar., 1918.—The history of dusting, formula for arsenate of lead and sulfur dusts for fruit insects and diseases, methods of application and results are given. Peach scab (Cladosporium) was controlled, apple diseases not.—*J. B. S. Norton.*

641. STEVENS, F. L., W. A. RUTH AND C. S. SPOONER. **Pear blight wind borne.** Science 48: 449–450. 1918.—Branches of pear trees were enclosed in insect proof cages. No insects were found in the cages but the enclosed twigs blighted to the same extent as those not so treated. "The only tenable hypothesis is that wind was the chief agent of transmission."—Supporting evidence lies in the fact that insects were not abundant in the orchard and that no insects have been observed feeding on the exudate, of *Bacillus amylovorus*, from cankers.

642. STEVENS, H. E. **Florida citrus diseases.** Florida Agric. Exp. Sta. Bull. 150: 15–110. *Fig. 6–54.* Aug., 1918.—The bulletin is intended to bring together information relating to all citrus diseases in Florida. Besides parasitic diseases it treats also "a few other diseases and injuries where such are common, unusual or likely to be confused with some other diseases." Part of the bulletin gives limited information on the care of the grove, fungicides, spraying and antiseptics. The following diseases and injuries are treated; withertip, anthracnose, tear stain and bloom blight all due to *Colletotrichum gloeosporioides;* foot-rot (*Phytophthora terrestria*); gummosis and its psorosis type, cause undetermined; blight, cause undetermined; scaly bark (*Cladosporium herbarum* var. *citricolum*); citrus canker (*Pseudomonas citri*); scab (*Cladosporium citri*); citrus knot (*Sphaeropsis tumefaciens*); several leaf spots, cause undetermined; sooty mold, name of fungus not given; (*Septobasidium pedicillatum*) algal leaf and bark spot (*Cephaleuros virescens*); lichens, names not given, causing leaf and bark spots; frenching, probably caused by lack of humus in the soil or sometimes by lightning, or poor drainage; black melanose or greasy spot, cause undetermined; dodder (*Cuscuta* sp.); cassytha (a plant in its habits similar to dodder) sunscald, lightning and cold injuries.—*C. D. Sherbakoff.*

643. TEMPLE, C. E. **Report of the state pathologist.** Rept. Maryland Agric. Soc. 2: 161–169. Mar., 1918.—Reports the spread of plant diseases favored by the wet weather in 1917; 4000 bushels of seed wheat treated for smut; inspection and quarantine against white pine blister rust, not yet found in Maryland; certification of 10,000 bushels of potatoes for the Western Maryland seed potato growers; the use of two Fusarium-resistant tomato selections and the production of seed of the same on a large scale; detailed discussion of successful experiments in spraying for Septoria tomato blight. Other diseases discussed are pear and apple blight, peach yellows, bacterial leaf spot of peach and *Phoma persicae.*—*J. B. S. Norton.*

644. THOMAS, H. E. **Vegetable diseases. Vanilla diseases. Citrus diseases.** [*In:* Report of the Plant Pathologist.] Porto Rico (Federal) Agric. Exp. Sta. Rept. 1917: 28–30. 1918.—Brief notes on vegetable diseases as follows:—A wilt disease of beans (caused by an undetermined Phycomycete); lima bean rust (caused by *Uredo concors*, and sometimes followed by *Isariopsis griseola*); bean powdery mildew (caused by *Erysiphe polygoni?*); which was easily controlled by dusting with equal parts of lime and flowers of sulfur; cabbage black rot (caused by *Ps. campestris*); tomato downy mildew (caused by *Phytophthora infestans*); leaf mold (caused by *Cladosporium fulvum*); and wilt (caused by *B. solanacearum*). Other less important disease-producing organisms observed: *Cercospora beticola* on beets, *Plas-*

mopara cubensis on melons, *Cercospora hibisci* on okra, *Cercospora personata* on peanut, *Phytophthora infestans* on potato, *Cercospora cruenta* and *Isariopsis griseola* on bean.—Spotting of vanilla leaves observed. Chiefly due to the alga, *Mycoidea parasitica*, and occasionally to *Gloeosporium rufomaculans*.—A root disease, apparently new, is mentioned. A species of Fusarium repeatedly isolated; infection experiments under way.—The withertip fungus (*Colletotrichum gloeosporioides*) of citrus, and the citrus scab fungus (*Cladosporium citri*) were active during the year. Cereal diseases observed: leaf spot of corn, due to *Helminthosporium inconspicuum*; rice blast, caused by *Piricularia oryzae*, and wilt of wheat, caused by *Sclerotium rolfsii*.—*L. R. Hesler.*

645. White, T. H. **Fertilizing and cultural experiments with Irish potatoes.** Maryland Agric. Exp. Sta. Bull. 215: 151–174. Mar., 1918.—Injury to the seed piece from excess of fertilizer in the row, sulfur and slaked lime is reported, while raw phosphate rock and, especially, dry Bordeaux on the seed piece gave a better stand. Acid phosphate and wet germicides on the seed piece were injurious. The effect of cutting, storage and source of seed on stand and yield are described.—*J. B. S. Norton.*

646. Wicks, W. H., and C. H. Heard. **Bean growing in Arkansas.** Arkansas Agric. Exp. Sta. Circ. 41: 1–4. April, 1918.—Popular presentation giving brief report of varietal tests and control of common diseases.—*John A. Elliott.*

647. Wilson, Orville Turner. **A storage fermentation of dasheens.** Phytopath. 8: 547–549. *1 fig.* Oct., 1918.—"Tubers" of *Colocasia esculenta* were found in which the tissue was of the consistency and appearance of a commerical moist yeast culture and which emitted an odor of fermentation. A yeast was isolated which on inoculation set up fermentation in healthy tubers. "True parasitism of the yeast is not established by the observations but rather its capacity to initiate and carry on a fermentation in the injured tissues, which in turn spreads to surrounding healthy tissues."

648. Wolf, Frederick A. **Intumescences, with a note on mechanical injury as a cause of their development.** Jour. Agric. Res. 13: 253–260. *1 fig., pl. 18–19.* Apr. 22, 1918.—Following a brief introductory discussion of plant intumesences in general and theories regarding their cause, an outbreak on cabbage, following a severe wind storm, is described and attributed to the stimulus resulting from mechanical injury occasioned by wind-blown sand. The proximate cause is believed to be a problem of absorption due to a heightened hydration capacity of the cell colloids resulting from acid production by oxidation. [See Bot. Absts. 1, Entry 735.]—*H. A. Edson.*

PHARMACOGNOSY

Henry Kraemer, *Editor*

649. [Anonymous.] **A possible new source of thymol.** Agric. News [through Chem. and Druggist 90: 815. 1918].—*Ocymum viride*, native of West Africa and abundant in Sierra Leone, has been cultivated experimentally in the Seychelles. The green shoots from plants eight months old yielded 0.45 per cent of oil which contained 52 per cent of thymol. It was estimated that the yield of oil per acre from one cutting would be 35 pounds and that four or five cuttings could be made annually. It is suggested that the cultivation of this plant be continued in Seychelles and be introduced into the West Indies.—*E. N. Gathercoal.*

650. Anonymous. **Tunis caraway.** Chem. and Druggist. 90: 796. 1918.—Holland, which cultivates 20,000 acres of caraway, normally supplies the London market with caraway for medicinal and culinary purposes. Due to the recent abnormal shortage of this article in the London market, Indian dill-seed (*Peucedanum Sowa*) has been sold as a substitute but is very inferior to the Dutch caraway. Mogador caraway from Morocco is suitable only

for distilling oil for perfuming soap. "Levant" caraway from Tunis, a novelty in the London market, is the most acceptable substitute for the Dutch article so far offered. North Russian caraway is especially suited for the flavoring of the liqueur known as kümmel but yields very little volatile oil.—Caraway cultivation as an industry of the United Kingdom is urged, and the Board of Agriculture is requested to ascertain the best varieties of *Carum Carvi* and the most favorable conditions of soil, moisture, fertilizer, etc., for insuring the largest yield of volatile oil for use in soap-manufacture, of oil containing the most carvone for chemical and medicinal uses and of oil possessing the finest flavor for the manufacture of liqueurs.—*E. N. Gathercoal.*

651. [Anonymous.] **Report of Agricultural Department of Dominica: West Indian oil of bay.** Kew Bull. No. 5, p. 158. May, 1918.—West Indian bay oil is distilled from the leaves of *Pimenta acris* Kostel, and is used in the preparation of bay rum. The leaves of two varieties of *P. acris* known locally as "Bois d'Inde Citronelle" and "Bois d'Inde Anise" are frequently admixed with the leaves of the true bay to the great detriment of the oil subsequently distilled. The oil from the "Citronella" variety (*P. acris var. citrifolia*) contains citral and has the flavor of lemon. Why the oil from the "Anise" variety does not reach the desired standard is not yet clear.

The leaves have been submitted to Kew but no distinctions can be found between the three varieties except that the crushed leaf of *citrifolia* possesses the lemon-like odor.

The varietal forms intermingle in extensive wild growths near the coasts of many of the West Indian islands and the leaves are gathered indiscriminately. Much harm has already resulted to the bay oil industry and it is a matter of great concern to the distillers that either some method be determined for distinguishing the undesirable leaves or that plantations of the true *P. acris* be established.—*E. N. Gathercoal.*

652. [Anonymous.] **Eucalyptus oil.** Chem. and Druggist 90: 811. 1918 [Editorial].—The eucalyptus oil industry in Australia is of an importance comparable to the lemon oil industry of Italy. Both play an important part in the economic welfare of the respective countries. Although there are 300 species of eucalypts in Australia less than twenty-five of these can be utilized for their oil. *E. Macarthuri* is now receiving special attention in Australia as it is a very rapid grower and its oil contains 60 per cent of geranyl acetate.

The annual production of the oil (nearly a million pounds) has been well maintained within recent years but, owing to restricted transportation, large stocks have been accumulating which will soon compel distilleries to close, while in the London market a shortage of the oil is experienced with a consequent rise in price.—*E. N. Gathercoal.*

653. [Anonymous.] **Saponiferous plants as soap substitutes in Germany.** Seifenfabrikant 37: 374. 1918. [Through J. Soc. Chem. Ind.]—Natural soap substitutes, occurring in certain plants are recommended in view of the shortage of fat and soap. The soapwort (*Saponaria officinalis*) contains in the leaves, stems and especially in the roots abundant amounts of saponin, producing a thick soap lather in water. The fresh roots are thoroughly washed, dried, and reduced to as fine a powder as possible, which is used directly as such for the hands or with soda for linen. Other common plants, although their saponin content is lower than that of soapwort, can also be used, namely ragged robbin (*Lychnis Flos-cuculi*), bachelor's button (Melandryum species), flaxweed (Silene species), corn cockle (*Agrostemma Githago*), rupture wort (*Herniaria glabra*), etc.—*Arno Viehoever.*

654. [Anonymous.] **Japanese agar agar.** Chem. and Druggist 90: 50. June, 1918.—Agar is prepared by the same primitive methods in vogue for the last three centuries; though recently a new company has been projected to combine many small concerns and develop a real factory industry. Most of the product is exported, the exports being two to three million pounds. China is a large buyer and before the war Germany also led. Since the war Great Britain has been first but now the United States leads in the amount purchased.—*E. N. Gathercoal.*

655. [ANONYMOUS.] **Valerian root.** Chem. and Druggist 90: 50. June, 1918.—The demand for this drug far exceeds the supply in England, as it is extensively used in the treatment of shellshock. The price has trebled since the war began. Indian valerian is as valuable as English-grown valerian and more agreeable to the taste. The Japanese valerian has an unpleasant flavor and gives a different taste to the tincture. English herb-growers should increase their plantings using all the available suckers this season. Other drugs such as Scutellaria and Cypripedium might be used as nerve-tonics.—*E. N. Gathercoal.*

656. [ANONYMOUS.] **The castor oil industry.** Chem. and Druggist 90: 43. June, 1918.—British production from castor beans imported from India is from 3500 to 4000 tons per month but the government uses practically all of this for motor lubrication. None of the finest water-white medicinal oil is found in pharmaceutical trade for only neutralized second-grade of oil is released by the Castor Oil Committee and this is rationed in amount far below the needs of the trade.

The demand in the United States is also very heavy and here an effort has been made to plant 200,000 acres with Indian seed, government contracts being made with growers to take the seed at $3.00 to $3.60 per bushel.

India exported in 1916–17, 1,723,000 gallons of castor oil and a large quantity of seed, though no figures are available as to the actual quantity of castor oil produced in India. It is used very extensively as a burning oil in lamps and as a lubricant.

In the West Indies it is estimated that 100,000 acres have been planted with Indian seed and in Brazil its cultivation has been largely extended. *E. N. Gathercoal.*

657. [ANONYMOUS.] **Herb crops.** Chem. and Druggist, 90. June, 1918. Mention is made of satisfactory crops at Mitcham of marshmallow, southernwood, tansy, hyssop, red sage, balm and chamomile. Rue, peppermint, scullcap and pennyroyal are thin crops. Thyme, mint, sage and savory are very satisfactory.—*E. N. Gathercoal.*

658. ASAHINA, YASUHIKO, AND SENTARO MAYEDA. **The Korean Ko-Woren.** Yakugakuzasshi. March, 1918. [Through Jour. Pharm. et Chim.]—The Korean drug represents the rhizome of *Jeffersonia dubia* Benth, and Hook. (*Berberida ceae*) while the Chinese drug of the same name is derived from *Picrorrhiza Kurrooa* Royl. (Scrophulariaceae). The anatomy of the Jeffersonia d. rhizome is described in detail and the resemblance to the hydrastis rhizome mentioned. No berberine was found, confirming thus in a way Gordin's results with the American species *Jeffersonia diphylla,* in which he, contrary to other authors could not find any berberine. Another alkaloid however was isolated, yielding an amorphous carbonate, melting towards 210°C. with decomposition, sol. in water, less sol. in alcohol and acetone and not at all in ether. The picrate was amorphous, the double salts with gold or platinum chloride were confusedly crystalline.—*Arno Viehoever.*

659. BACHARACH, ALFRED LOUIS. **Two plant products from Columbia.** Analyst 43: 289. 1918.—I. Oil of *Jessenia polycarpa* Karst.—This oil is from the nut of the "sejen" or "unamo" palm, known locally as "aceite de sejen" (oil of palm). In the llanos of San Martin it is considered to be superior to cod-liver oil for use in chest and lung complaints. It is also used in cooking. It is refined locally and finds a ready sale in the drug stores of Bogota and other Columbian towns.—The oil is pale yellow, has a slight fluorescence and not unpleasant odor; somewhat refractive and does not become rancid with time. It reacts similar to olive oil in the "elaïdin" test and is miscible in all proportions with ether, acetone, petroleum spirit, light petroleum, benzene, chloroform, carbon tetrachloride and ethyl acetate but not with water, absolute alcohol, 95 per cent rectified spirit and glacial acetic acid. A table shows the various analytical values as compared with those of olive oil. The only notable difference is in the iodine values of the oils. The oil could, presumably, be used for all purposes for which olive oil is employed.

II. Seeds of *Caryodendron Orinocense* Karst.—These seeds are used at Villarvicencio, in the llanos of San Martin, where they are roasted and eaten, being known locally as "Tacay."

They sell readily at about 3 d. per pound. The seeds have a greyish-brown brittle husk, and are of a whitish color, fairly tough, 23 to 27 mm. long, 15 to 20 mm. broad and weigh about 3.1 gm.—The composition is similar to that of Walnuts. The analytical values of the ether extract are given. The taste of the roasted nuts is similar to burnt almonds.—*C. J. Zufall.*

660. BALJET, M. H. **Localisation of the active glucosides in the leaves of the genus Digitalis.** Schweiz. Apoth. Ztg. 56: 247. 1918. [Through Jour. Pharm. et Chim.]—With means of sodium picrate reagent (one drop of 1 per cent picric acid sol. mixed with one drop of 10 per cent sod. hydroxide sol.) applied to sections, the cells containing the glucosides are colored orange within 1 or 2 minutes. In all the species of Digitalis studied, including *D. purpurea, lutea, ambigua,* the glucosides were thus located in the epidermal cells, the non-glandular hairs, in the endodermis of the vascular bundles and sometimes in the subepidermal collenchyma. The leaf margin (epidermis and endodermis) gave the strongest reaction, the base of the petiole only a very faint one. In many leaves the upper epidermis reacts, the lower not, supporting thus—according to the author—the viewpoint that glucosides are waste products.—*Arno Viehoever.*

661. BALLARD, C. W. **Wild Anthemis, a possible matricaria adulterant.** Jour. Amer. Pharm. Assoc. 7: 952–4. 1918.—Flowering heads of the wild grown *Anthemis nobilis* Lin. were offered as Chamomile or Spanish Chamomile. They contain more volatile oil and bitter principles than the cultivated and are probably more active, but more liable to produce nausea. As the one-time official Roman Chamomile was the cultivated flowering head, the wild product bears little resemblance to it; in fact, it has a greater resemblance to the German Chamomile, *Matricaria Chamomilla* Lin. The distinguishing characters showing the difference between these three drugs are summarized and the powdered drug of Wild Anthemis is illustrated and its histology given in detail.—*O. A. Farwell.*

662. BOHRISCH, P. **The sulphuric acid test for Strophanthus seeds.** Pharm. Ztg. 63: 318. 1918. [Through Jour. Soc. Chem. Ind.]—Of the various modifications proposed for the carrying out of the test the following procedure is recommended: Thin cross-sections of the seeds (*Str. Kombé*), placed on an object glass and treated with ether to remove the fat, are covered with one drop of sulphuric acid, containing ⅕ of its weight of water. The deep green coloration, indicating the presence of strophanthin, should, especially when some magnification is used, be observable in the endosperm and at least the outer portions of the embryo. When big sections, seeds cut in half, were used, the results of the test were very variable and indefinite.—*Arno Viehoever.*

663. COCKING, T. TRUSTING, AND JAMES D. KETTLE. **The evolution of balsam of tolu.** Pharm. Jour. 101: 40. 1918.—The method of the British Pharmacopoeia (1914) for the estimation of the aromatic acids in storax would not be used for the estimation of these acids in balsam of tolu. However, boiling out the aromatic acids with magnesium oxide and water, in the presence of a small quantity of xylene to soften the resinous matter was found to satisfactorily extract these acids from balsam tolu.—A table of analytical data is appended exhibiting for fourteen samples the acid value, ester value, saponification value, percentage of free and combined benzoic and cinnamic acids, etc. The percentage of total balsamic acids present ranged from 32.66, to 47.56 with the exception of two samples containing 24 per cent, which were probably sophisticated. These two samples also were low in ester value but were high in acid value and saponification value. It is recommended that, in the pharmacopoeia, limits of ester value be adopted instead of saponification value.—*E. N. Gathercoal.*

664. EWING, C. O. **Karaya gum, a substitute for tragacanth.** Jour. Amer. Pharm. Assoc. 7: 787–90. 1918.—Shows that the relative values of commercial gums depends upon the purposes to which they are best suited, those suitable for pharmaceutical requirements being rated amongst the most valuable. One of the most valuable is gum Tragacanth, official in the U. S. P. IX and defined as the dried gummy exudate from *Astragalus gummifer* Labil.

or from other Asiatic species of *Astragalus*. Substitute gums have been derived from *Sterculia urens* Roxb., *S. villosa* Roxb., *S. Tragacantha* Lindl., *Cochlospermum Gossipium* DC. or from other species of these genera. These gums are known under a large number of vernacular names in India, one of them being *Karaya*. It occurs in irregular, rounded, translucent lumps of a pale buff color, *without* the *ribbon-like bands* characteristic of true Tragacanth, but in the powdered state may readily be mistaken for it. The volatile acidity of gum from *Cochlospermum*, when hydrolized with phosphoric acid and distilled, corresponds to about 14 or 15 per cent of acetic acid; of *Sterculia* to about 16 per cent; and of *Astragalus* to only 2 or 3 per cent. Karaya gum is considered to be about equal to true Tragacanth as an emulsifying agent, and is used extensively in India as a substitute for it; the author, however, thinks that when used as an emulsifying agent about ¼ to ½ more should be used; he also suggests that a solution could be used as a substitute for glycerin.—*O. A. Farwell.*

665. Ewing, C. O., and J. F. Clevenger. **So-called Syrian alkanet, Macrotomia Cephalotes DC.** Jour. Amer. Pharm. Assoc. 7: 591–4. 1918.—This is a root much longer (20 to 40 cm.) and thicker (2 to 5 cm.) than the true Alkanet, *Alkanna tinctoria* Tausch, and is many-headed while the true is few-headed; the color is black-violet, somewhat metallic, that of the true being a dull maroon; it is distinctly spirally twisted. The Syrian was freer from sand but true Alkanet had a fine sprinkling of it. The coloring extracts of each are very similar in nature and consist of at least two chemical substances. The coloring extract in the Syrian is present in much larger quantities than in the true and, as it is of equal tinctorial strength, may be considered to be a valuable substitute.—*O. A. Farwell.*

666. Ewing, C. O., and J. F. Clevenger. **Piptostegia root, Piptostegia Pisonis Mart., so-called "Brazilian jalap."** Jour. Amer. Pharm. Assoc. 10: 855–858. 1918.—Material offered for entry as "Jalap" proved upon investigation to be the root of *Piptostegia Pisonis* Mart., referred to by Holmes as "the ordinary Jalap from Brazil." A macroscopical description of the root is given, as also several photographs of transverse sections.—Preliminary experiments by the authors confirm Passmore's report that "over 20 per cent of resin answering to all of the B. P. and U. S. P. VIII tests for the resin of true or Vera Cruz jalap, but only 0.85 per cent is soluble in ether," but indicates that the drug possesses considerable cathartic power, yet quite dissimilar to that of true jalap. Assay of the root, according to U. S. P. method yielded 23 per cent of resin. The specific rotation proved to be −48.5 compared to that of true jalap, which is reported to be in the neighborhood of −36 to −37. A comparison of the resin contents and specific rotations is included in a tabulated report on several of the Convolvulaceous roots, e.g., Piptostegia, Jalap, Scammony, Mexican Scammony and Morning Glory. A marked dissimilarity of Piptostegia root is noted, especially compared with that of Jalap. The results of the pharmacological experiments are also discussed. —*A. Hogstad, Jr.*

667. Faes, M. H. **Pyrethrum and its culture.** Schweiz. Apoth. Ztg. 56: 429. 1918. [Through Jour. Pharm. et Chim.]—The successful plantation in Switzerland is discussed of plants, yielding insect flowers, grown from seeds of *Chrysanthemum cinerariaefolium*, originated in Dalmatia and neighbouring states. The cultivation, collection, etc., are described in detail. The material obtained was of the same quality as that grown in the countries of foreign origin. Faes recommends the application of insect powder, suspended in black-soap sol in the fight of Cochylis, destructive to vineyards, and points out that the action of pyrethrum on the eggs is more effective than nicotine in certain respects.—*Arno Viehoever.*

668. Faes, H. **Cultivation of insect flowers.** Schweiz. Apoth. Ztg. 56: 429. 1918.—True Dalmatian insect-flowers, *Chrysanthemum cinerariifolium*, are now being cultivated in Switzerland. Seed from Austria, Hungary and Dalmatia has been tried since 1912. By 1917, 97 plantations carrying 25,000 plants had been established. The seed from spring flowers sown in shallow trenches in rather stony soil with a south aspect will produce hardy plants that first bloom about mid-June of their second year. The flowers are gathered before

expanding thus furnishing the "closed" and "half-open" commercial varieties. An aqueous extract of the flowers is used in black-soap solution as a spray for vineyards. The commercial demand for the flowers is steady and the grower is certain of a market for his product.—*E. N. Gathercoal.*

669. Farwell, O. A. **Brazilian jalap and some allied drugs.** Jour. Amer. Pharm. Assoc. **10**: 852–855. 1918.—According to the deductions made by the author, the proper binomial for Brazilian Jalap is *Operculina macrocarpa* (Linn.) Urban. In Brazil the drug is commonly known as *Batata de purga* and *Batata purgante*. *Tapioco de Purga* is a product derived from the root. The generic characters of Operculina and a description of the root follow.—An examination of material procured from London agreed in all points with that of the description, and in transverse section bears resemblance to the roots of Mexican Scammony, Poke and, more pronounced, to those of White Bryony. These resemblances are readily noted by a comparison of the photographs included in the article.—The author goes on to describe the root, yielding Resina Drastica, which is of unknown origin and Mexican Scammony derived from the tuberous roots of *Ipomoea Orizabensis* (Pell) Ledenois, which is known as Male or Orizaba Jalap. From the resemblances of the root yielding Resina Drastica, to that of Brasilian Jalap and Mexican Scammony, the author hazards the guess that it is from some plant closely allied to them, consequently from the Convolvulaceae.—*A. Hogstad, Jr.*

670. Hill, C. A. **Supplies of vegetable drugs.** Presidential address before British Pharmaceutical Conference, 1918. Pharm. Jour. **101**: 19. 1918.—A *résumé* of British drug stocks after four years of war, with the whys and wherefores of increased prices, shortages, etc. About forty principal drugs are dealt with.—*E. N. Gathercoal.*

671. Hill, A. W. **The genus Strychnos in India and the East.** Kew Bull. 1917. Page 121.—Ninety-two species are described. Those of pharmacognostical interest besides *S. Nux-vomica* and *S. Ignatia* are *S. colubrina*, Linn., yielding Lignum Colubrinum of mediaeval pharmacy; *S. quadrangularis*, Hill, from which the Malayan arrow-poison "Spoh aker" is obtained; *S. Gaultheriana*, Pierre, which supplies Hoangnan Bark, introduced from Cochin China as remedy for leprosy, and *S. Nux blanda*, Hill, of Burma, which produces a seed very similar in appearance to Nux vomica but devoid of strychnine or brucine. *S. Nux-vomica* appears to be a variable plant and it would be useful to submit authentic seeds of the different varieties and of species allied to it, to determine which are the richest in strychnine.—*E. N. Gathercoal.*

672. Holm, Theo. **Medicinal plants of North America.** Merck's Rept. **27**: 115–7, 168–70. 1918.—The author discusses both *Juglans nigra* Lin. and *Juglans cinerea* Lin., contrasting these with *Carya* and *Platycarya* and giving a general botanical description with illustrations of the flowers and of the histology of the root. The internal structure of the vegetative organs is described in detail. The roots of the two species are identical as regards structure and the stems of *J. cinerea* differ from those of *J. nigra* only in the stereome which represents almost closed sheaths and being interspersed with large, very thin-walled, and porous sclereids.—*O. A. Farwell.*

673. Scoville, W. L. **Brazilian jalap.** Jour. Amer. Pharm. Assoc. **9**: 785–787. 1918.—An examination of Brazilian Jalap, *Piptostegia Pisonis*, showed that the resin from this drug is a complex body of glucosidal nature, similar in chemical character and contains constituents of like character to that of *Exogonium Purga*. The resin meets the requirements of the U. S. P., with the exception of solubility in water and acid number. The yield is three to four times as great and the physiological action is similar. Detailed results of the examination are given.—*A. Hogstad, Jr.*

674. Spiegel, L., and A. Meyer. **Saponin from mowrah seed.** Ber. Deutsch. Pharm. Ges. **28**: 100. 1918. [Through Jour. Chem. Soc.]—The saponin mowrin, formerly isolated

from mowrah seeds (*Bassia longifolia*) was found to be a mixture of 2 substances, the main one, $C_{42} H_{68} O_{25}$, being more soluble in alcohol and yielding upon hydrolysis laevulose, arabinose and mowric acid. This acid is a mixture of a crystalline mowragenic acid, $C_{19} H_{28} O_5$, and an amorphous mowragenic acid, $C_{19} H_{30} O_{16}$. Careful hydrolysis with dilute acetic acid yielded an intermediate pentoside, $C_{29} H_{50} O_{16}$.—*Arno Viehoever.*

675. VIEHOEVER, A., C. O. EWING AND J. F. CLEVENGER. **Commerical viburnum barks and preparations.** Jour. Amer. Pharm. Assoc. 7: 944–52. 1918.—Discusses commercial barks derived from *Viburnum Opulus* Lin., *V. prunifolium* Lin., and *V. Lentago* Lin. and the substitution of the bark of *Acer spicatum* Lam. for that of the first named above. Black Haw (*V. prunifolium* or *V. Lentago*) was generally true to name but Cramp Bark was generally *Acer spicatum*. The barks of both the stems and roots of all four species are illustrated in cross sections and the distinguishing characters of each pointed out. The Viburnum tannins give a green color with iron salts whereas a blue color is developed by the Maple tannins.—*O. A. Farwell.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

[Unsigned abstracts are by the editor.]

676. FISCHER, M. H. **The colloidal-chemical theory of water absorption by protoplasm. A fifth response to some criticisms.** Jour. Amer. Chem. Soc. 40: 862–867. 1918.

677. HENDERSON, L. J. **On the swelling of protein colloids. A reply.** Jour. Amer. Chem. Soc. 40: 867–868. 1918.

678. HENDERSON, L. J., AND E. J. COHN. **On the swelling of protein colloids. A reply to Professor Martin H. Fischer.** Jour. Amer. Chem. Soc. 40: 857–861. 1918.

679. LLOYD, F. E. **The colloidal properties of protoplasm: Imbibition in relation to growth.** Trans. Roy. Soc. Canada III, 11: 133–139. *1 fig.* 1917.—In the growth of pollen tubes of *Phaseolus odoratus* imbibition pressure is a dominant factor. This is shown by the fact that growth rates vary inversely with the concentration of the medium (up to 50 per cent of cane-sugar). The pollen bursts in water and after brief initial growth in concentration up to *ca.* 20 per cent. In this maximum rates without bursting occur. By combining acids and alkalis in connections from n/400 to n/25,600 with 20 per cent cane sugar, a maximum growth rate was found to occur at *ca.* n/3,200 of the acid (acetic) and of the alkali (sodium hydrate) component, the rates being lower for both higher and lower concentrations. In higher concentrations coagulation occurs; in lower, excessive imbibition and bursting.

The swelling rates of gelatin were also studied. It was substantiated that there is a concentration of acid which induces maximum rate (above n/640) and it was found that the same is true for alkalis. It was further found that the maximum rate occurs first at high concentrations, but as time elapses, at successively lower concentrations. For inorganic acids the maximum rate occurs at lower concentrations than for organic acids. There is also a concentration (of acid and of alkali) at which a minimum swelling rate less than that for water occurs.—It is argued that an analogy obtains between the living protoplasm and gelatin, but the wide differences of effective concentrations are to be noted. [See Bot. Absts. 1, Entry 680.]—*F. E. Lloyd.*

680. LLOYD, F. E. **The effect of acids and alkalis on the growth of the protoplasm in pollen tubes.** Mem. Torr. Bot. Club 17: 84–89. 1918.—Contents of this paper are included in abstract under preceding Entry, 679.

681. MacDougal, D. T. **Annual report of the director of the Department of Botanical Research.** Carnegie Inst. Washington, Year Book 16: 59–98. 1918.—Brief reports on the projects (mostly physiological) under investigation by the staff of the Desert Botanical Laboratory, Tucson, Arizona.

682. Clowes, G. H. A. **On the action exerted by antagonistic electrolytes on permeability of emulsion membranes.** Proc. Soc. Exp. Biol. and Med. 15: 108–111. 1918.—A preliminary note indicating that artificial membranes of filter paper saturated with an emulsion of oil and soap exhibit variations in electrical conductivity and permeability under the influence of antagonistic agents corresponding to those which have been found for living plant tissues.

683. Clowes, G. H. A. **On the electrical resistance and permeability of tumor tissues.** Proc. Soc. Exp. Biol. and Med. 15: 107–108. 1918.—Preliminary determinations indicate that cancer tissues and tissues derived from plant galls are uniformly more permeable than normal tissues. It would appear that permeability bears some relation to proliferation and speed of growth.

684. Harris, J. A. **On the osmotic concentration of the tissue fluids of desert Loranthaceae.** Mem. Torr. Bot. Club 17: 307–315. 1918.—Continuing work on the general subject of the osmotic pressure of parasitic *Loranthaceae,* it is developed that in three desert forms concentration of the tissue fluids is approximately twice as great as that of species in the montane rain-forest of the Jamaican Blue Mountains. [See Bot. Absts. 1, Entry 828.]

685. Stiles, Walter, and Ingvar Jörgensen. **Quantitative measurement of permeability.** Bot. Gaz. 65: 526–533. 1918.—A polemical paper and critique. After certain practical suggestions on the complexity of the system involved in cell permeability phenomena, the authors take issue with Osterhout as to the validity of his critism of their work. They further discuss the published work of Osterhout regarding the "permeability of the protoplasm" under three heads; namely: "(1) which part of the system it is, the permeability of which he intends to measure; (2) how far the values he obtains for the electrical conductivity of plant tissues are true measures of this conductivity; and (3) whether it is legitimate to assume that the electrical conductivity is a measure of the permeability." They conclude (1) that to have his results accepted he must define permeability in a quantitative sense, (2) prove that his method gives values for the conductivity of the tissue employed, and (3) furnish evidence that electrical conductivity of tissue is a measure of permeability as he employs the term.

686. Thoday, D. **On turgescence and the absorption of water by the cells of plants.** New Phytol. 17: 108–113. 1918.—The writer gives a brief "elementary exposition of the conditions which govern the equilibrium of a cell with a watery solution and with other cells" and illustrates the consequences by applying them in definite cases.—*Zeller* (St. Louis).

687. True, R. H. **Notes on osmotic experiments with marine algae.** Bot. Gaz. 65: 71–82. 1918.—In an endeavor to ascertain the osmotic value of the sea water at Woods Hole, Massachusetts, the author first studied certain fresh water algae the cells of which were found to have an osmotic equivalent of from 6.7 to 7.2 atmospheres as measured by cane sugar and sodium chloride respectively. The pressure found corresponds to a 30 per cent sea water solution. The plasmolytic data indicate that the sea water has an osmotic value of 22.6 atmospheres, whereas determined cryoscopically by Garrey it was 23.8 atmospheres. The osmotic surplus of *Cladophora*, *Enteromorpha*, and *Chaetomorpha* was 6.6 and 11.7 atmospheres when determined respectively by cane sugar and sodium chloride—the great difference being explainable on the basis of the greater penetrability of the latter.

688. Duggar, B. M., and W. W. Bonns. **The effect of Bordeaux mixture on the rate of transpiration.** Ann. Missouri Bot. Gard. 5: 153–176. *Pl. 10.* 1918.—In continuation of

earlier work extensive experiments are conducted on potted tomatoes, potatoes, marguerites, tobacco, and umbrella plants, and also on excised leaves of the castor bean. All tests were made on a table, or carrier, arranged to give general horizontal rotation as well as rotation of the individual pot carriers. Under the conditions maintained in the greenhouse it was found that a film of Bordeaux mixture, and certain other analogous materials, effect an increase in the rate of transpiration of the usual potted mesophytic plants, which is mainly, if not entirely, confined to the night intervals. The excised leaves exhibit a similar transpiration increase as a result of the presence of the spray. On the other hand, potted *Cyperus esculentus* shows no augmentation of transpiration rate. The facts are interpreted as suggesting that under night conditions there may be assumed to exist in such mesophytic types a state of guttation, or incipient guttation and that accordingly a "bibulous" surface film would facilitate the molar movement of water and possibly greatly increase the actively evaporating surface. It is assumed that a condition approaching guttation may not be realized in *Cyperus*.

689. Allison, F. E. **Some availability studies with ammonium phosphate and its chemical and biological effects upon the soil.** Soil Science 5: 1–80. *Fig. 1–10.* 1918.—Since the development of a method satisfactory for the manufacture of ammonium phosphate it has become important to establish the conditions under which this nutrient may be economically applied for the growth of various crops. This paper includes the results of an extensive laboratory and greenhouse study employing the usual tumbler, fresh-soil method. In general it is found that ammonium phosphate is a fertilizer of the same general type as those usually furnishing nitrogen and phosphate and the value is equivalent to the amount of nitrogen as ammonium sulphate and of phosphorus as acid phosphate. The nitrification experiments show an increase in nitrate accumulation in garden and meadow soil followed by a decline indicating nitrate assimilation by the micro-organisms. Calcium carbonate promoted nitrification, but calcium oxide did not. In this case the ammonium phosphate gave results similar to ammonium sulphate.—With respect to the effect of the ammonium phosphate upon germination the results are comparable with those of other fertilizers, an application of 150 pounds or more being the limit per acre in the experiments with corn.

690. Ayers, S. H., and P. Rupp. **Simultaneous acid and alkaline bacterial fermentations from dextrose and the salts of the organic acids respectively.** Abst. Bact. 2: 11. 1918.

691. Buchanan, R. E. **Determination of the fermentation capacity of a single bacterial cell.** Abst. Bact. 2: 11. 1918.

692. Bunker, J. W. M. **Further studies on the effect of H-ion concentration upon the diphtheria bacillus.** Abst. Bact. 2: 10. 1918.

693. Clark, W. M. **Remarks upon the use of indicators.** Abst. Bact. 2: 10. 1918.

694. Cohen, B., and W. M. Clark. **The influence of the P_H of media upon the reproduction of some common bacteria.** Abst. Bact. 2: 10. 1918.

695. Corson, G. E., and A. L. Bakke. **The use of iron in nutrient solutions for plants.** Proc. Iowa Acad. Sci. 24: 477–482. *Fig. 86–88.* 1917.

696. Dortland, C. T. J. **The possibility of obtaining nitrogenous fertilizers by utilizing waste materials for the fixation of nitrogen by nitrogen-fixing bacteria.** Abst. Bact. 2: 2. 1918.

697. Fred, E. B. **Studies of the reactions of media for higher plants and bacteria.** Abst. Bact. 2: 10. 1918.

698. Gibbs, W. M., and E. B. Fred. **Isloation and study of the nitrifying organisms.** Abst. Bact. 2: 1. 1918.

699. Gillespie, L. J. **The growth of the potato-scab microorganisms at various hydrogen-ion concentrations as related to the occurrence of potato scab.** [See Bot. Absts. 1, Entry 309.] Abst. Bact. 2: 1. 1918.

700. Koch, G. P. **The potassium requirements of Bacillus subtilis.** Abst. Bact. 2: 2. 1918.

701. Koch, G. P. **Potassium requirements of bacteria.** Soil Science 5: 219–224. 1918.—In the work here reported the method is the same as in a previous paper and the same organism, *Bacillus subtilis*, was employed. The results represent therefore the influence of potassium sulphate as shown by the formation of ammonia from dialyzed peptone. It was shown in the first place that the absence of potassium exerts a strong inhibition on ammonia formation and in the second place that the concentration may be varied from .24 mg. to 1.25 without seriously affecting the activity of the organism.

702. Koser, S. A. **Studies upon bacterial nutrition. The utilization of nitrogenous compounds of definite chemical composition.** Abst. Bact. 2: 12. 1918.

703. LeFevre, E. **A preliminary study of salt organisms.** Abst. Bact. 2: 7. 1918.

704. Lipman, C. B. **The significance of the sulfur in sulfate of ammonia applied to certain soils.** Soil Science 5: 81–86. 1918.

705. Loeb, J. **The origin of the conception of physiologically balanced salt solutions.** Jour. Biol. Chem. 34: 503–504. 1918.

706. Maquenne, L., and E. Demoussy. **Influence des sels metalliques sur la germination en presence de calcium.** Compt. rend. Acad. Sci. Paris 166: 89–92. 1918.—Continuing in the direction of work previously reported the authors have tested three concentrations of a variety of salts, employing, in general, dilutions somewhat below those which may be considered toxic to the plant for each salt used alone. He used NaCl, KCl, $(NH_4)_2SO_4$, $SrCl_2$, $BaCl_2$, $MgSO_4$, $ZnSO_4$, $MnCl_2$, $PbCl_2$, and $CuSo_4$ and in duplicate tests the same concentrations of these salts together with 0.5 mgm. $CaSO_4$ or 0.4 mgm. $CaCl_2$ in a vessel containing 40 grams of sand and 10 cc. of the salt tested. All the salts except $BaCl_2$ and lower concentrations of $PbCl_2$ lessened the benefits derived from controls in which calcium salts alone were employed.

707. Northrup, Z. **Anaerobic culture volumeter: a simple apparatus for the quantitative and qualitative determination of gas produced by microorganisms.** Abst. Bact. 2: 13. 1918.

708. Osterhout, W. J. V. **The basis of measurement of antagonism.** Jour. Biol. Chem. 34: 363–368. *Fig. 1–4.* 1918.—Along the line of earlier work the author discusses briefly the importance of the additive effect in the measure of antagonism. He endeavors to show by curves and discussion that without knowledge of the additive effect the observed effect may not indicate antagonism except under special conditions, thus giving weight to the necessity of determining this additive effect—defined by him as that effect which would be found if no antagonism existed.

709. Prucha, M. J., H. M. Weeter and W. H. Chambers. **Hypochlorites as a disinfectant for rubber.** Abst. Bact. 2: 19. 1918.

710. Brown, C. W., and J. F. Morgan. **An interpretation of the cycles of carbon, nitrogen and sulfur.** Abst. Bact. 2: 2. 1918.

711. Osterhout, W. J. V. **A demonstration of photosynthesis.** Amer. Jour. Bot. 5: 105–111. *Fig. 1–2.* 1918.—A piece of relatively simple apparatus is described whereby it is possible to demonstrate and to measure photosynthesis. The apparatus permits the removal of samples of the gas so that the progress of the phenomenon may be followed as also the effects of conditions upon it. It is applicable to certain types of respiration study.

712. Osterhout, W. J. V., and A. R. C. Haas. **A simple method of measuring photosynthesis.** Science 47: 420–422. 1918.—It was ascertained that the amount of photosynthesis of aquatic plants, especially algae could be determined by the change in PH value. Marine and fresh water plants caused the water to become more alkaline, the former in natural sea water and the latter in solutions containing bicarbonates. The amount of photosynthesis is approximately a linear function of the change in PH value. Phenolphthalein was used as an indicator.

713. Murray, T. J. **The effect of different plant tissues on the fixation of atmospheric nitrogen.** Virginia Agric. Exp. Sta. Tech. Bull. 15: 93–102. 1917. [Received, 1918.]—To determine the influence of plant material on the nitrogen fixation of Azotobacter the author added 1 per cent of tissue from various grasses, legumes, and a few other plants—21 in all—to Hagerstown silt loam and to sand cultures incubating at 28°C. Nitrogen determinations were made after various intervals with the result that in the case of the Hagerstown silt loam a stimulating action from the addition of all of the organic materials was found with the exception of three, whereas in the sand cultures only twelve produced a slight stimulation of nitrogen fixation.

714. Robbins, W. J. **Direct assimilation of organic carbon by Ceratodon purpureus.** Bot. Gaz. 65: 543–551. *Fig. 1–5.* 1918.—This moss was grown 2.5 months in pure cultures in flasks of 125 cc. capacity. The culture solution consisted of 50 cc. of a mineral nutrient solution with the addition (except in certain controls) of a sufficient amount of the organic compound to make 0.1 mol. Cultures in triplicate were placed in the light and in darkness. The greatest amount of growth in the dark was made with levulose as a source of carbon; apparently considerably less with glucose, cane sugar, and maltose; very little with galactose and lactose; and none with mannite, glycerol, and starch. In all in which growth occurred in the dark starch was also formed. In the light there was growth in all cultures, "showing that none [of the compounds mentioned] was toxic to the moss." Quantitative comparative data are given showing that with levulose the amount of growth was two to seven times greater than with glucose. Abundant protonema were produced in the dark but light is required for the production of the moss plant.

715. Bidwell, G. L. **A physical and chemical study of the kafir kernel.** U. S. Dept. Agric. Bull. 634: 1–6. *Fig.* 1. 1918.

716. Fiske, C. H. **The inhibition of foaming.** Jour. Biol. Chem. 35: 411–413. 1918.—A general discussion of principles involved in the prevention of foaming where air is necessarily forced through solutions such as soaps and proteins. An efficient inhibitor has been found in isoamyl isovalerate. Methods of preparing this compound are given.

717. Givens, M. H. **The composition of dried vegetables with special reference to their nitrogen and calcium content.** Soc. Exp. Biol. and Med. 15: 101. 1918.

718. Hall, H. M., and T. H. Goodspeed. **An emergency supply of rubber.** Science 47: 452–454. 1918.—Brief indications showing the content of rubber in species of *Chrysothamnus*, *Ericameria*, and *Stenotus*.

719. KOESSLER, J. H. **Studies on pollen and pollen disease. I. The chemical composition of rag-weed pollen.** Jour. Biol. Chem. 35: 415–424. 1918.—This is an endeavor to work toward a determination of that chemical fraction of the pollen substance inducing hay fever, and the present paper involves a study of chemical composition with particular attention to nitrogen distribution. Two species of *Ambrosia* were employed. A feature of interest in the analyses is the relatively high content of histidin in protein hydrolysis, especially as compared with the amount of arginin. [See Bot. Absts. 1, Entry 1408.]

720. MACLEAN, H. **Lecithin and allied substances: the lipins. Monograph on biochemistry.** *206 p.* Longmans, Green & Co., London. 1918.—The present volume supplements the monograph by Leathes on fats, and is restricted to the phosphatides and the cerebrosides, which are here designated lipins with the understanding that this term is employed for "substances of a fat-like nature yielding on hydrolysis fatty acids or derivatives of fatty acids and containing in their molecule either nitrogen, or nitrogen and phosphorus."

The author gives a relatively simple classification, including under the phsophatides two representatives of mono-amino-mono, one of di-amino-mono, and one of mono-amino-di phosphatides. Of the cerebrosides phrenosin and kerosin alone are recognized. He regards other forms occurring in the literature as insufficiently established and not definitely isolated. A full account is given of the occurrence, extraction, isolation, and purification of both groups. He regards protagon as a mixture of the two groups referred to and devotes considerable attention to a discussion of insufficiently characterized lipin-like substances. The plant phosphatides are shown to offer one opportunity for future research. The difficulties in the study of these bodies appear to be greater than in the case of corresponding substances in animals. In general, however, the conclusion is derived that there is no essential difference between the two groups. The presence of sugar in the analyses seems to indicate that cerebrosides also occur in plant tissues, but very few attempts have been made to isolate and characterize these bodies. The author concludes that the biological significance of lipins is unknown, and that the views thus far advanced as to their functions are merely suggestive.

721. PAMMEL, L. H., AND A. W. DOX. **The protein content and microchemical tests of the seeds of some common Iowa weeds.** Proc. Iowa Acad. Sci. 24: 527–532. 1917. [Received, 1918.]—A quantitative study was made of the protein content of about 60 weed seed, likewise microchemical tests to determine qualitatively the amount of starch, protein and fat in a much larger number.

722. PLIMMER, R. H. A. **The chemical constitution of the proteins.** Part 1. Analysis. 3rd ed. *XII + 174 p.* Longmans, Green & Co., London, 1917.—A new edition of this monograph is justified by the importance of the contributions which have been made during the past five years in relation to methods of protein hydrolysis and the quantitative estimation of the cleavage products. Extensive data are given showing the nature of various proteins as regards the amino acid constituents and their nitrogen partition. There is eliminated from Part 1 in this edition the description of the amino acids, which is reserved for separate treatment.

723. RICHARDS, H. M. **Determination of acidity in plant tissues.** Mem. Torr. Bot. Club 17: 241–245. 1918.—A brief discussion of methods of obtaining samples of plant juices as nearly that of the normal tissues as possible for titration purposes.

724. SANDO, C. E., AND H. H. BARTLETT. **The flavones of Rhus.** Amer. Jour. Bot. 5: 112–119. 1918. Flavone pigments were isolated from *Rhus typhina*, *R. glabra*, and *R. copallina*. Analyses and careful study of the pigments from wood and from leaves enable the authors to verify Perkin's conclusion to the effect that the same flavone is not likely to be found in wood and leaves of the same species. It seems to be established that fisetin is the wood flavone, while myricetin is distinctively the leaf flavone. No relationship between the two flavones, nor between these and the anthocyanins of leaf and berry have been established.

725. Tanner, F. W. **Studies on the bacterial metabolism of sulfur.** Jour. Amer. Chem. Soc. 40: 663–669. 1918.—This is a second paper on the general subject stated and is devoted to a study of the relations of thirty species or strains of yeast-like fungi assembled from various sources. The paper is concerned chiefly with the formation of hydrogen-sulphide from the following sulfur-compounds or sources: peptone; cystine; sodium taurocholate, phenol sulfonate, sulfate, sulfite, and thiosulfate; potassium thiocyanate; thiourea; and free sulfur. Cystine is reduced by all of the organisms studied except one, sodium sulfite by all except six. The other compounds noted are reduced by a considerable number of organisms except that in the cases of sodium phenolsulfonate, and taurocholate, one and two organism respectively are able to effect the reduction. Only eight organisms failed to produce hydrogen sulfide from free sulfur. The test for hydrogen sulfide was made by means of a strip of filter paper treated with saturated lead acetate and a small amount of glycerol, suspended in the culture over the substrate.

726. Viehoever, A., L. H. Chernoff and C. O. Johns. **Chemistry of the cotton plant, with special reference to upland cotton.** Jour. Agric. Res. 13: 353–366. *Fig. 1.* 1918.—This investigation was undertaken in order to isolate the weevil at the same time to determine the products of hydrolysis and to establish whether or not the upland cotton contained the substances formerly isolated from Indian and Egyptian types. It is shown that both quercimeritrin and isoquercitrin are present in upland cotton. Gossypitrin and gossypetin were not found. The investigation revealed the presence of an ethereal oil in *G. hirsutum* dissimilar to that found in the root of *G. herbaceum.*

727. Zoller, H. F. **Some constituents of the American grapefruit (Citrus decumana).** Jour. Ind. and Eng. Chem. 10: 363–374. *Fig. 1–2.* 1918.—After a general discussion of the introduction of the grapefruit and its heralded therapeutic value the author submits analyses of the peel showing the amounts of essential oils (limonene, citral, pinene, and alcohols), the glucoside naringin, and pectin. Citric acid, naringin and pectin are found to decrease with long storage, while reducing sugars and sucrose show an increase. Culls are considered an available source of industrial alcohol.

728. Asai, Toichi. **Physiologische Untersuchungen über eine neue, in der Gerbbrühe gedeihende Kahmhefe.** Jour. Coll. Sci. Imp. Univ. Tokyo 39: 1–42. *Pl. 1–2.* 1918.—The author describes a new yeast, *Mycoderma tannica,* common in the tanning industry. On gypsum blocks it forms no spores at 30°C., but produces resting cells filled with fat and glycogen. The organism grows well on ethyl alcohol as a source of carbon and particularly well on the hexoses but very indifferently upon maltose, lactose, and many polysaccharids. Alcoholic fermentation is extremely weak, and this is somewhat augumented by the presence of tannin up to three per cent. Tannin is fermented, but the curve of the production of tannase does not correspond with the curve of growth. Alcohol and glucose are converted in part to oxalic and acetic acid. As a source of nitrogen amino acids such as asparagin and tyrosin are most usable, ammonium salts of organic and inorganic acids serve fairly well, while nitrites and nitrates inhibit development.

729. Bigelow, W. D. **Problems of canning operations.** Amer. Jour. Public Health 8: 212–216. 1918.

730. Horn, J. S. **The importance of pure culture work in industrial processes.** Abst. Bact. 2: 7. 1918.

731. Nelson, V. E., and A. J. Beck. **By-products of the fermentation of cabbage.** Jour. Amer. Chem. Soc. 40: 1001–1005. 1918.—A complete description of methods of estimation is reserved for future publication. Cans of fermented cabbage were bought on the market. The material was finally comminuted, made slightly acid to congo red with sulphuric acid, and subjected to steam distillation until two liters were obtained. The volatile acid was

determined by titration with barium hydroxide and the alcohols and esters redistilled from two-thirds of the original distillate until 50 cc. were obtained. This last "flavor" solution was saponified with 10 cc. of 20 per cent potassium hydroxide and the alcohols distilled off, the acids of esters being now obtained as potassium salts. After decomposition with dilute sulphuric acid and distillation these were titrated with barium hydroxide. The free acids and those obtained from ester saponification and alcohol oxidation were subjected to the Duclaux method of analysis. The alcohols had previously been concentrated by distillation by means of potassium dichromate in sulphuric acid. Acetic and proprionic acids form the main volatile portion, although formic acid was twice isolated, volatile acidity representing a considerable portion of the total. It was concluded that the fixed acidity was due to inactive lactic acid. Alcohols of the same extent as volatile acids were found and these consist of ethyl and propyl alcohol. Esters contribute to the flavor and aroma.

732. YOUNG, V. H. **Some factors affecting inulase formation in Aspergillus niger.** Plant World 21: 114–133. 1918.—Upon ascertaining that cultures of *Aspergillus niger* grew well on inulin and came to fruiting somewhat earlier than those on soluble sugars the author proceeded to determine some relations of this fungus to inulase production. The enzyme was found to be secreted under all conditions studied, but in greatest amount at the time of sporulation. The presence of inulin in the culture medium stimulates inulase production, yet the enzyme is produced in the presence of other carbohydrates, those more closely related to inulin being apparently more efficient in stimulation. The quantity of inulin in the medium is a factor affecting the amount of the enzyme secreted, yet there is no close proportionate relation. The production of the enzyme is not a starvation phenomenon.

733. OSTERHOUT, W. J. V. **The determination of buffer effects in measuring respiration.** Jour. Biol. Chem. 35: 237–240. *Fig. 1.* 1918.—In connection with the indicator method of measuring respiration it is often necessary to measure the buffer of reagents added. The author has constructed an apparatus consisting of a capillary tube connected by rubber tubing to two Y-tubes, one arm of which is connected in turn with thistle-tubes, the other arms acting as inlet and outlet for gases, thus permitting the addition of measured quantities of CO_2 to the liquid whose volume and P_H is known or which may be determined after the addition of the CO_2.

734. BIOLETTI, F. T., AND F. C. H. FLOSSFEDER. **Topping and pinching vines.** California Agric. Exp. Sta. Bull. 296: 369–384. *Fig. 1–3.* 1918.—The experiments reported in this publication point clearly to an ultimate injury to the vigor of certain types of grapes grown under the conditions mentioned when the practice is continued year after year. It is pointed out that under conditions of excessive vigor of growth the control of development by pinching and topping may not prove so injurious. The topping practised consisted in cutting off one or more feet of growing shoot during summer or autumn while the pinching process involves removal with thumb and fore finger of the extreme tips of growing shoots in late spring and early summer. The processes had been supposed to be decidedly advantageous. [See Bot. Absts. 1, Entry 1655.]

735. WOLF, F. A. **Intumescences, with a note on mechanical injury as a cause of their development.** Jour. Agric. Res. 13: 253–260. *Pl. 18–19, fig. 1.* 1918.—After a brief review of the reported causes of intumescences on plants the author is inclined to accept the view of Fischer based on colloid water relations in an acid medium and he presents observations and experiments to show that wind-blown sand may induce intumescence of cabbage leaves. The over growth of cells is considered to be related to absorption and probably due to intensified hydration of the cell colloids in the presence of increased acid content as a result of oxidation. [See Bot. Absts. 1, Entry 648.]

736. LOEB, J. **Chemical basis of correlation. I. Production of equal masses of shoots by equal masses of sister leaves in Bryophyllum calycinum.** Bot. Gaz. 65: 150–174. *Fig. 1–18.*

1918.—Pursuing further his studies in regeneration and correlation with *Bryophyllum* the author has sought to determine by many and varied experiments if equal masses of sister leaves in the same time and under similar conditions produce approximately equal masses of shoots. Such a law of mass relations was established. It was found, furthermore, that these mass relations hold although the number of shoots may differ. Leaves which had been cut into parts or reduced in mass yielded a proportionate decrease in the mass of shoots. It is believed that the absorption of water is necessary to initiate growth and therefore when leaves are suspended in moist air those grow out first which by location or other accidental occurrence obtain first the adequate water supply. [See Bot. Absts. 1, Entry 68.]

737. SAITO, K. **Die Parthenosporenbildung bei Zygosaccharomyces und ihre Abhängigkeit von der Temperatur.** Bot. Mag. 32: 26–27. 1918.—Parthenospores in species of *Zygosaccharomyces* have been known and the author attempts to determine the conditions under which such spores are produced. It is shown that by constant incubation at temperatures of 33–35°C. only parthenospores are produced. The behaviour of these organisms in respect to temperature is therefore analogous to that of certain Thallophytes and higher plants.

738. HAYDEN, J. L. R., AND C. P. STEINMETZ. **Effect of artificial light on the growth and ripening of plants.** Gen. Elec. Rev. 21: 232. 1918.—The growth and ripening of string beans under Mazda electric lamps was compared with the same under natural conditions. The fruit ripened in a little more than half the time required under daylight alone.—*Zeller (St. Louis).*

739. TODA, YASUMOCHI. **Physiological studies on Schistostega osmundacea (Dicks.) Mohr.** Jour. Coll. Sci. Imp. Univ. Tokyo 40 (Art. 5): 1–30. *Pl. 1–2.* 1918.—This luminous moss occurs in small caves where the light intensity is considerably reduced and the optimum intensity is found to be 0.02–0.002 (Bunsen's unit), the protonema continuing to thrive, however, at 0.0008. The plant does not grow in places where the intensity of light is over 1. Related to assimilation in a feeble light seems to be the spherical cell of the protonema. Next to white light the moss thrives best in the blue and violet region of the spectrum. For shoot development the optimum temperature is 16 to 25°C. and the optimum humidity 90 to 100. The plant is stimulated by a relatively high content of calcium salts in the medium and Marchal's solution is a favorable cultural medium.

740. BUCHANAN, R. E., G. E. THOMPSON, P. F. ORR and E. M. BRUETT. **Notes on conditions which influence thermal death points.** Abst. Bact. 2: 5. 1918.

741. BUSHNELL, L. D. **The influence of cold shock in the sterilization of canned foods.** Jour. Ind. and Eng. Chem. 10: 432–436. 1918.—A report of numerous experiments on the value of the "blanching" process and of small amounts of sodium chloride, acetic acid, and other factors in reducing the time necessary for the proper sterilization or "processing" of canned foods. In general the results show that cold shock or rapid cooling is of practically no value, and similarly a small amount of salt is ineffective, while a small amount of acetic acid promotes a more rapid sterilization.

742. LEVINE, M. **The physiological properties of two species of poisonous mushrooms.** Mem. Torr. Bot. Club 17: 176–201. *Pl. 1–2.* 1918.—In this study no attempt was madeto isolate the toxic constituents of the fungi employed, but attention was confined wholly to the general physiological effects of infusions of *Panaeolus venenosus*, *P. retirugis* and, by comparison, *Agaricus campestris*. Such experiments have become important as a result of relatively recent cases of poisoning arising from the use of species of *Panaeolus* growing on mushroom beds. The experiments include the effect (1) of infusions injected into or fed to guinea pigs and rabbits, (2) on the heart beat and blood pressure of a cat, (3) on the gastrocnemius of the frog and (4) on the sciatic and vagus nerves of the frog. [See Bot. Absts. 1, Entry 421.]

743. NOYES, H. A., AND L. YODER. **Effect of carbon dioxide gas on bacterial numbers, ammonification, and nitrification.** Abst. Bact. 2: 3. 1918.

744. STEINBERG, R. A. **A study of some factors influencing the stimulative action of zinc sulphate on the growth of Aspergillus niger. 1. The effect of the presence of zinc in the cultural flasks.** Mem. Torr. Bot. Club 17: 287–293. 1918.—Special attention is drawn to the composition of the cultural flask itself and data are produced showing that *Aspergillus niger* attains a greater growth in Jena glass than in Kavalier Bohemian or in Pyrex. On adding small quantities (2.5 mgm. zinc per cubic centimeter) of zinc sulphate to cultures in the two wares last mentioned a similar increased growth amount is obtained. It is shown to be extremely probable that the increased growth in Jena flasks is due to the presence of zinc in this glass–the occurrence of zinc in Jena glassware being established by the work of others.

745. HARPER, R. A. **The evolution of cell types and contact and pressure responses in Pediastrum.** Mem. Torr. Bot. Club 17: 210–240. *Fig. 1–27.* 1918.

746. MORITA, K. **Influences de la pollinisation et d'autres actions extérieures sur la fleur des Cymbidium virens, Lindl.** Bot. Mag. 32: 39–52. *Fig. 1–10.* 1918.—A study was made of the influence of (1) pollination on the period of flowering and appearance of the flower, (2) of dead pollen and pollen extract, (3) such mechanical stimuli as grains of sand and injury, (4) of saprophytic fungi such as *Aspergillus*, *Mucor*, and *Penicillium*, (5) of foreign pollen, (6) chemical agents. It is shown that pollination prolongs the period of flowering and closes the stigma as well as producing growth influences in the gynoecium. Dead pollen and aqueous pollen extracts affect only the closing of the stigma. No effect is produced by mechanical injury. The pollen of certain other orchids affects markedly the closing of the stigma, while that of many species has no action whatever. The effects of certain organic acids and sugars remain more or less doubtful.

747. NORTON, J. B. S., AND C. E. LEATHERS. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull. 216: 175–226. 1918.—Brief notes are given on the factors influencing the setting of fruit and the productions of seed in the chief crop plants. An extensive bibliography is included. [See Bot. Absts. 1, Entry 628.]

748. WINSLOW, C.-E. A., AND B. COHEN. **The distribution and relative viability of B. coli and B. aerogenes in water.** Abst. Bact. 2: 4. 1918.

749. RAMSEY, G. B. **Influence of moisture and temperature upon infection by Spongospora subterranea.** Phytopath. 8: 29–31. 1918.—A greenhouse experiment showing that infection by this fungus is practically restricted to cool moist conditions. [See Bot. Absts. 1, Entry 135.]

750. PAINE, S. O., AND L. M. SAUNDERS. **Note on a peculiarity exhibited by the testa of wrinkled peas.** Ann. Bot. 32: 174. 1918.

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

GENERAL

751. BURNHAM, STEWART H. **The flora of Indian Ladder and vicinity: together with descriptive notes on the scenery.** Torreya 18: 101–116, 127–149. *Fig. 1–9.* 1918.—Representatives from all groups of non-vascular cryptogams are included in the present paper. *Lecanora cerina siderites* (*Placodium cerinum siderites* Tuck.) appears as a new combination.

BRYOPHYTES

752. BROTHERUS, V. F. **Contributions to the bryological flora of the Philippines. V.** Philip. Jour. Sci. (Bot.) **13**: 201–222. 1918.—One hundred seventy-two species are enumerated, 18 of which are proposed as new. New species of the following genera are described: Barbella, 1; Dicranoloma, 2; Ectropothecium, 1; Eriopus, 1; Fissidens, 1; Garovaglia, 2; Gymnostomiella, 1; Leskeodon, 1; Meiothecium, 1; Pseudopohlia, 1; Rhaphidostegium, 1; Sematophyllum, 1; Taxithelium, 3; and Trichosteleum, 1.—*Wm. H. Brown.*

753. COKER, DOROTHY. **Revision of the North American species of Eucalypta.** Bull. Torr. Bot. Club **45**: 433–449. *Pl.* 13–14. 1918.—Miss Coker has studied intensively the North American species of the genus Eucalypta Schreb., reducing the 17 species in Engler & Prantl to 8, except as *E. lacera* Ren. & Card. is left doubtful, no material of it being available for study. Synonymy, distribution and figures of each accepted species are given and some of the variant forms are distinguished as varieties. All species accepted are boreal and were originally described from Europe.—*A. Le Roy Andrews.*

754. DIXON, H. N. **The mosses collected by the Smithsonian African Expedition, 1909–1910.** Smithsonian Misc. Coll. **69**[2]: 1–28. *Pl. 1–2.* 1918.—Forty-eight species are listed, collected by Dr. Edgar A. Mearns in British East Africa, mostly on Mt. Kenia. They include new species in Sphagnum, Hymenostylium, Leptodontiopsis, Rhacomitrium, Bryum, Philonotis, Breutelia, Polytrichum, Hygroamblystegium, Calliergon, Isopterygium, Rhynchostegiella. The occurrence of boreal species on the higher mountains of equatorial Africa is discussed.—*A. Le Roy Andrews.*

755. DIXON, H. N. **Uganda mosses collected by R. Dümmer and others.** Smithsonian Misc. Coll. **69**[8]: 1–10. *Pl. 1.* 1918.—Twenty-seven species of mosses are enumerated, of which 8 are figured and described as new. The latter are placed in the genera Brachymenium, Pilotrichella, Cyathophorum (a genus not hitherto known from Africa), Rhacopilum (2), Lindbergia, Thuidium, Ectropothecium.—*A. Le Roy Andrews.*

756. FRYE, T. C. **Illustrated key to the western Sphagnaceae.** Bryologist **21**: 37–48. *Pl. 17–23.* 1918.—The area covered is from the Rocky Mountains to the Pacific Ocean and from the northern boundary of Mexico to the Arctic Ocean. Twenty-four species and two varieties are included, with key for identification and illustrations of all but one species. The figures bring out the points of diagnostic value, especially the outline and relative size of the stem-leaf, the section of the branch-leaf and the characters of the individual hyaline cell of the branch-leaf.—*A. Le Roy Andrews.*

757. LUISIER, A. **Les mousses de Madère.** Broteria **16**: 29–48, 49–83. *1 pl.* 1918.—A continuation of an historical introduction to Madeiran bryology published in 1917. Special attention is given to the relationship between the flora of Madeira and that of the other Atlantic Islands, with careful examination of all previously published records. The present list includes an extensively annotated list of species from Sphagnum to Barbula with localities and critical notes. One plate illustrates certain species discussed. One new form in Campylopus, and one new combination in the same genus, appear.—*E. B. Chamberlain.*

758. POTIER DE LA VARDE, R. **Ptychomitrium subcrispatum Thér. et P. de la V. (spec. nov. natalensis).** Rev. Gén. Bot. **30**: 65–69. *Pl. 17.* 1918.—This new species from Natal, South Africa, is described and figured in detailed comparison with *P. crispatum* (H. & Grev.) Schimp.—*A. Le Roy Andrews.*

759. RÖLL, J. **Vierter Beitrag zur Moosflora des Erzgebirges.** Hedwigia **60**: 12–49. 1918.—The article consists mostly of lists of species and forms of Sphagnum, together with some notes upon other characteristic mosses.—*A. Le Roy Andrews.*

760. THÉRIOT, I. **À propos du Braunia diaphana (C. M.) Jaeg. et du Leucodon sekistos Welw. et Duby.** Bull. Soc. Bot. Genève 9: 135–136. 1917.—*Braunia diaphana* belongs to the section Eubraunia, being a close relative of *B. Schimperiana*. *Leucodon sekistos* is completely synonymous with *Braunia diaphana*.—*E. B. Chamberlain.*

761. WILLIAMS, R. S. **Some farthest north lichens and mosses of the Peary Arctic Expedition to Grant Land in 1906.** Torreya 18: 210–211. 1918.—Nine species of lichens and six of mosses are listed from the north shore of Grant Land. [See Bot. Absts. 1, Entry 762.]

LICHENS

762. WILLIAMS, R. S. **Some farthest north lichens and mosses of the Peary Arctic Expedition to Grant Land in 1906.** Torreya 18: 210–211. 1918. [See Bot. Absts. 1, 761.]

ALGAE

763. CROW, W. BERNARD. **The classification of some colonial Chlamydomonads.** New Phytol. 17: 151–159. *Fig. 1–2.* 1918.—The ordinal name Chlamydomonadales is suggested for the unicellular forms of the Isokontae, exclusive of certain ones regarded as reduced from filamentous forms. Among the motile members, the author recognizes the Sphaerellaceae as distinct from the Chlamydomonadaceae, but considers the two as closely related lines of ascent. The two groups are contrasted as to character of cell wall, presence or absence of pits, number and distribution of contractile vacuoles, and character of chloroplast. Among the motile colonial forms the author does not regard resemblance in general type of the coenobia as indicative of affinity; for the classification of these forms he turns to cell structure. On this basis, Volvox and Stephanosphaera are classed with Sphaerella in the Sphaerellaceae, while the remaining motile coenobic genera are grouped with Chlamydomonas in the Chlamydomonadaceae. The author, furthermore, does not regard the extreme differentiation of the coenobium of Volvox into reproductive and vegetative cells as the climax of the differentiation apparent in Pleodorina (Eudorina). Some material of *Pandorina morum* is reported upon in which many colonies showed from one to four cells, usually grouped near one end of the coenobium, which were much smaller than the rest and very poor in food material. These cells were not observed to divide, although in some cases the larger cells of the colonies were seen in division. This differentiation into vegetative and reproductive cells the author believes to have arisen independently in Volvox and Pandorina and that it represents in both cases "a fulfilment of the general tendency towards division of labor."

764. HODGETTS, WILLIAM J. **Uronema elongatum, a new freshwater member of the Ulotrichaceae.** New Phytol. 17: 159–166. *Fig. 1–11.* 1918.—The species is described from Birmingham, England. Details of cell structure, zoospore-formation and germination, attachment, and cell division are given. The author favors the retention of Uronema as a separate genus rather than to include it in Ulothrix, as suggested by Gaidukov.

765. HOWE, MARSHALL A. **The marine algae and marine spermatophytes of the Tomas Barrera Expedition to Cuba.** Smithsonian Misc. Coll. 68[11]: 1–13. *1 fig.* 1918.—The present list embraces 65 named species of algae and 4 referred to genus only. It is the most extensive list of Cuban algae thus far published and includes a considerable number of species believed to be attributed to Cuba for the first time. *Phormidium Hendersonii* is described as new. *Sarcomenia filamentosa* M. A. Howe, previously known only from the Florida type specimens, appears in the list. Notes on habitat and collections accompany the species. Two spermatophytes, *Halophila baillonis* Asch. and *H. Engelmannii* Asch., are included in the list.

766. Moore, George T. **Algological notes. III. A wood-penetrating alga, Gomontia lignicola, n. sp.** Ann. Missouri Bot. Gard. 5: 211–224. *Pl. 13–16.* 1918.—The new species is described from fresh water on the island of Nashawena, near Woods Hole, Massachusetts. The filaments are usually unbranched, rarely somewhat branched, with the striking characteristic of having most of the chlorophyll concentrated in the terminal cell (and in the spore from which the filament develops in case the former is still attached), the remaining cells being almost colorless. Of importance are the observations on the zoospores. Bornet and Flahault in *G. polyrhiza* reported biciliate zoospores of two sizes (without, however, observing any conjugation), while Wille records zoospores from the same species with four cilia. The present author found only biciliate zoospores in *G. lignicola*, and these all of one size. No conjugation was observed, and the belief is expressed that the presence of quadriciliate and biciliate spores in Gomontia does not in itself justify the assumption sometimes made that the latter are gametes. The zoospores may directly produce vegetative filaments or they may enlarge greatly to form resting spores which at maturity have thickened walls and frequently "lamellate excrescences and protuberances, referred to by other authors as 'rhizoids.'" The resting spores may rest for months or even years but ultimately germinate by the formation of from one to four filaments. Neither akinetes nor aplanospores were found and the author suggests the possibility that the aplanospores described by Bornet and Flahault from *G. polyrhiza* were merely zoospores which failed to escape and later came to rest. Bodies considered by some algologists as akinetes are identified by the author with resting spores developed from zoospores.

767. Setchell, W. A. **Parasitism among the red algae.** Proc. Amer. Phil. Soc. 57: 155–172. 1918.—The author excludes in the present paper all obvious epiphytes and endophytes and considers only those forms which upon one or more of the criteria of probable parasitism, viz., penetration of host, reduction of thallus, and loss of color, appear to him as undoubted parasites. An extensive historical account, with bibliography, is followed, by an enumeration, by families, of parasitic species of red algae. The list includes 42 species belonging to 29 genera, the latter distributed among 10 families. Including nine species and four genera, all as yet unpublished, parasitic species are known only from 11 of the 21 usually recognized families of red algae. Of these the Gigartinaceae (with 5 genera and 12 species) and the Rhodomelaceae (with 9 genera and 17 species) contain one-half or over of the known genera and species of parasitic red algae. The point is brought out that of these known parasitic species over 80 per cent are parasitic on another member of the same family, 16 per cent on red algae not of the same family as the parasite, and only 4 per cent on algae (brown) other than red. Attention is called to the case reported by Osterhout of the production of a dwarf parasitic generation on tetrasporic plants of *Agardhiella tenera* from the contents of a tetrasporangium acting as a whole. The author speaks of the similarity of the condition existing in this instance and that obtaining in many species of parasitic red algae which likewise show a close systematic relationship to their hosts. [See Bot. Absts. 1, Entry 1376.]

FUNGI

768. Adams, J. F. **Keithia on Chamaecyparis thyoides.** Torreya 18: 157–160. *Fig. 1–2.* 1918.—A new species, *Keithia Chamaecyparissi*, is described from Lakehurst, New Jersey. Previously described species have been reported on species of Juniperus, Thuja and Tsuga.

769. Arthur, J. C. **Uredinales of Guatemala based on collections by E. W. D. Holway. II. Aecidiaceae, exclusive of Puccinia and form-genera.** Amer. Jour. Bot. 5: 420–446. 1918. —The author includes detailed citations of collections and critical notes of 79 species included in 17 genera and here recorded on 116 hosts. Eight new species are described by Arthur and Holway, namely: *Ravenelia inquirenda*, *R. distans*, *R. bizonata*, *R. sololensis*, and *R. Mainsiana* on Mimosaceae; *Uromyces socius* on Loranthaceae; *U. illotus* on Fabaceae; and *U. Salmeae* on Carduaceae. The author also describes *Uropyxis Crotalariae* on *Crotalaria sp.*

and *Skierka Holwayi* on *Thouinidium sp.*, the latter representing the first species of this genus to be recognized in the flora of North America. A description is given of *Pucciniosira Eupatorii* Lagerheim, which has previously been known only as an herbarium name.—*H. S. Jackson.*

770. Arthur, J. C. **Uredinales of Guatemala based on collections by E. W. D. Holway. III. Puccinia, exclusive of species on Carduaceae.** Amer. Jour. Bot. 5: 462–489. 1918.—The author gives detailed citations of collections and critical notes on 76 species occurring on 119 hosts distributed in 29 families. Descriptions of twelve new species of *Puccinia* are given. *P. infuscans*, *P. macra*, *P. Aegopogonis*, and *P. subdigitata* on Poaceae; *P. vergrandis* and *P. aucta* on Dilleniaceae; *P. obscurata* on Ammiaceae; *P. gilva* on Heliotropiaceae; *P. fuscata* on Lamiaceae; and *P. eximia* on Rubiaceae are described by Arthur and Holway. *P. degener* and *P. filiola* on Lamiaceae are described by [E. B.] Mains and Holway. The author transfers *Argomyces parilis* Arth. to *Puccinia*. The telial stages have been discovered for *Uredo circinata* Schw., *U. velata* E. & E., and *U. varia* Diet. and the species transferred to *Puccinia*. The full life history of *Aecidium tubulosum* Pat. & Gaill. and *Caeoma Arracacharum* Lindr. having been determined, new combinations based on these names are proposed and a full description of the latter given.—*H. S. Jackson.*

771. Atkinson, Geo. F. **Preliminary notes on some new species of agarics.** Proc. Amer. Phil. Soc. 57: 354–356. 1918.—New species, all from the eastern United States, are described of the following genera: Amanita, 2; Hypholoma, 2; Lactarius, 2; and one each of Lepiota and Pholiota.

772. Atkinson, Geo. F. **The genus Galerula in North America.** Proc. Amer. Phil. Soc. 57: 357–374. 1918.—Galerula (Karsten) is employed here in the broader sense of the genus with practically the same limits as those used by Murrill in 1917 in North American Flora. The genus name Galera (Quelet), 1872, is antedated by Galera (Blume) employed in 1825 for a genus of orchids. Atkinson gives here his conception of the limits of the genus, and presents a synopsis of the species of North America. Fifty-eight species are listed, including a considerable number hitherto undescribed. The paper represents a critical structural study of the genus.—*H. M. Fitzpatrick.*

773. Brown, W. H. **The fungi cultivated by termites in the vicinity of Manila and Los Baños.** Philip. Jour. Sci. (Bot.) 13: 223–229. 1918.—The principal species found in the Philippine termite nests are the same as those reported from Ceylon and other tropical countries. —*H. S. Yates.*

774. Burt, Edward Angus. **The Thelephoraceae of North America. IX. Aleurodiscus.** Ann. Missouri Bot. Gard. 5: 177–203. *Fig. 1–14.* 1918.—Fourteen species of Aleurodiscus are described for North America, seven of these being hitherto undescribed, and three representing transfers from other genera. Figures are given for each species.—*H. M. Fitzpatrick.*

775. Drechsler, Charles. **The taxonomic position of the genus Actinomyces.** Proc. National Acad. Sci. U. S. A. 4: 221–224. 1918.—A summary of results obtained from cultural studies of a large number of species and strains of Actinomyces, both saprophytic and parasitic. The author concludes that there is no "adequate reason why the genus should not be classed, in an unqualified manner, with the Hyphomycetes, as a Mucedineous group with tendencies toward an erect Isaroid habit." A more detailed and illustrated account is to appear shortly in the Bot. Gaz.

776. Graff, Paul W. **Philippine Basidiomycetes. III.** Bull. Torr. Bot. Club 45: 451–469. *Pl. 15.* 1918.—Preceding parts of this series were published in Philip. Jour. Sci. (Bot.), 8: 299–307. 1913. *Ibid.* 9: 235–254. 1914. This part is a check-list of rusts, smuts, and higher

basidiomycetes collected in the Philippine Islands. All the collections cited are preserved in the herbarium of the Bureau of Science, Manila. A list of synonyms accompanies the citation of each species. The citations include seven smuts, three rusts, and forty-five species or varieties of hymenomycetes or hymenomycetous lichens. *Polystictus tabacinus* var. *barbatus* (Murr.) and *P. tabacinus* var. *substygius* (Berk. et Br.) are given as new combinations for *Polystictus spadiceus* var. *barbatus* Graff and *Fomes spadiceus* var. *halconensis* Bres., respectively.—*H. M. Fitzpatrick.*

777. Harper, Edward T. **Hypholoma aggregatum and H. delineatum.** Mycologia 10: 231–234. *Pl. 12.* 1918.—These species discussed particularly from the standpoint of nomenclature. The fruit-bodies and spores are figured.—*H. M. Fitzpatrick.*

778. Hedgcock, George G., Ellsworth Bethel, and N. Rex Hunt. **Piñon blister-rust.** Jour. Agric. Res. 14: 411–424. *Pl. 64–67.* 1918.—A species of Cronartium native on species of Ribes and Grossularia in Colorado and Arizona is described as *C. occidentale* sp. nov. The aecidial stage is demonstrated to be a Peridermium on *Pinus edulis* and *P. monophylla*, and is given the form-name *Peridermium occidentale.* The essential differences between this rust and *C. ribicola* are shown in tabular form.—*H. M. Fitzpatrick.*

779. House, H. D. **Report of the State Botanist.** New York State Mus. Bull. 197: 7–110. 1917.—Announcement is made (p. 9–11) of the completion for the museum of 56 groups of edible and poisonous mushrooms cast in wax, being a part of the Peck Memorial Collection. On p. 16–19 is given a list of specimens of fungi added to the herbarium. Under the head of "New or interesting species of fungi, IV" (p. 25–51) is given an annotated list, new species being described of the following genera: Cercospora, 1; Coryneum, 1; Cryptospora, 1; Cryptosporium, 1; Dendrodochium, 1; Diplodia, 2; Eutypella, 1; Gloeosporium, 1; Leptosphaeria, 1; Massarinula, 1; Microdiplodia, 1; Phoma, 1; Ramularia, 1; Septoria, 3; Sphaeropsis, 3. A new variety of *Sphaerophragmium hystricinum* (Ell.) Sacc. is published. *Macrophoma ceanothi* (*Macrophoma peckiana* D. & H.) and *Sphaeropsis tulipastri* (*Sphaeropsis magnoliae* Ell. & Dearn.) appear as new names. *Microdiplodia paupercula* (*Diplodia paupercula* B. & Br.) and *Metasphaeria anthelmintica* (*Sphaeria anthelmintica* Cke.) are published as new combinations. In addition, a list of 119 species of New York fungi from the collections of C. H. Peck and the author is given, the identifications having been made by Saccardo. The new species and varieties of this collection were described by Saccardo in Ann. Mycol. 13: 115–122. 1915, and Nuovo Gior. Bot. Ital. 23: 185–197. 1916. They are indicated in the present report by distinctive type. [See Bot. Absts. 1, Entry 831.]

780. Jackson, H. S. **The Ustilaginales of Indiana.** Proc. Indiana Acad. Sci. 1917: 119–132. 1918.—A total of forty-seven species is recorded for the state. All available collections are listed with critical notes on many of the species. An index to hosts is included.—*H. S. Jackson.*

781. Jackson, H. S. **The Uredinales of Indiana. II.** Proc. Indiana Acad. Sci. 1917: 133–137. 1918.—The author records the occurrence in Indiana of fourteen species of rusts on as many hosts which have not been previously recorded in state lists. Partial synonomy and critical notes are given. (Supplementary to: Jackson, H. S. The Uredinales of Indiana. Proc. Indiana Acad. Sci. 1915: 429–475. 1916.)—*H. S. Jackson.*

782. Jackson, H. S. **The Uredinales of Delaware.** Proc. Indiana Acad. Sci. 1917: 311–385. 1918.—The author lists all available collections and published records together with essential synonomy, critical notes and a detailed review of American culture work. A total of 129 species are recorded for the state, occurring on 232 host plants. *Aecidium Ivae* on *Iva ovaria* is described as new. *Coleosporium carneum* (Bosc.) comb. nov. is prepared to replace *Coleosporium Vernoniae* B. & C. Indexes of species and hosts are included.—*H. S. Jackson.*

783. MAYOR, EUG. **Contribution à l'étude de la flore mycologique des environs de Leysin.** Bull. Soc. Vaud. Sci. Nat. **52**: 113–149. 1918.—The author lists 170 species of parasitic fungi collected during July 1917 in the canton de Vaud, Switzerland, recording their occurrence on over 300 host plants. Critical notes and field observations are furnished for many of the species, particularly of the Uredinales, in which group 107 species are listed.—*H. S. Jackson.*

784. RHOADS, ARTHUR S. **Daldinia vernicosa—a pyroxylophilous fungus.** Mycologia **10**: 277–284. *Pl. 14.* 1918.—The writer's observations show this species to be a pyroxylophilous fungus, and common on burnt wood of dicotyledonous plants. This fungus and *D. concentrica* are briefly discussed and contrasted. The spores of both species are said to shed the exospore wall when mounted in dilute alkaline solutions, and spores exhibiting this phenomenon are figured.—*H. M. Fitzpatrick.*

785. SEAVER, F. J., AND W. T. HORNE. **Life-history studies in Sclerotinia.** Mem. Torr. Bot. Club **17**: 202–206. *Pl. 8.* 1918.—A species of Sclerotinia collected on the rootstocks of *Geranium maculatum* in Van Cortlandt Park, New York City, described as new under the name *Sclerotinia* (*Stromatinia*) *Geranii* sp. nov. The authors describe in detail culture work which shows that a species of Botrytis is the conidial stage. They state that the conidiophores were developed in pure culture from germinated ascospores. Both stages in the life history are figured.—*H. M. Fitzpatrick.*

786. SUMSTINE, D. R. **Fungi of Chautauqua County, New York.** New York State Mus. Bull. 197: 111–118. 1917.—A list, with brief notes on parasitic species, of 13 species of myxomycetes and 237 species of fungi.

787. TANAKA, TYOZABURÔ. **New Japanese fungi. Notes and translations. V.** Mycologia **10**: 285–288. 1918.—*Physalospora minuta* I. Miyake, *Ascochyta mori* I. Miyake, *Stagnospora mori* I. Miyake, *Robillarda mori* I. Miyake, *Cytodiplospora mori* I. Miyake, and *Dimerosporium mori* Y. Endô are listed together with English diagnoses and annotations. —*H. M. Fitzpatrick.*

788. TEHON, LEO. R. **Systematic relationship of Clithris.** Bot. Gaz. **65**: 552–555. *Pl. 9.* 1918.—Although the genus Clithris Fries is admitted to be of uncertain taxonomic relationships, facts are enumerated here which seem to show that it should be placed with the Phacidiales rather than with the Hysteriales. Colpoma Wallroth and Sporomega Corda are synonyms. Three new species are described on material collected by F. L. Stevens in Porto Rico: *Clithris clusiae, C. minor,* and *C. pardani.*—*H. M. Fitzpatrick.*

789. THAXTER, ROLAND. **New Laboulbeniales from Chile and New Zealand.** Proc. Amer. Acad. Arts and Sci. **54**: 207-232. 1918.—Diandromyces and Eudimeromyces appear as new genera, with *D. chilenus* and *E. chiliotis,* both from Corral, Chile, as the type species. New species, all from Chile, are described of the following genera: Dichomyces, 1; Cantharomyces, 4; Herpomyces, 1; Corethromyces, 2; Cucujomyces, 4. Laboulbenia, 2; Coreomyces, 2. From New Zealand, new species are described as follows: Monoicomyces, 1; Corethromyces, 3; Cucujomyces, 1. *Corethromyces andinus* (*Sphaleromyces andinus* Speg.) and *Cucujomyces elegantissimus* (*Stephanomyces elegantissimus* Speg.) appear as new combinations. The author gives critical notes on the three species of Cucujomyces described by Spegazzini and modifies the description of the genus by the latter who, it is stated, misinterpreted the antheridial characters.

790. YATES, H. S. **Fungi from British North Borneo.** Philip. Jour. Sci. (Bot.) **13**: 233–240. 1918.—Twenty-three species are enumerated, two of Meliola and one each of Hypocrea, Phaeodothiopsis, and Phyllosticta being proposed as new.—*Wm. H. Brown.*

791. ZINSSMEISTER, C. L. **Ramularia root-rots of ginseng.** Phytopath. **8**: 557–571. *Fig. 1–8.* 1918.—Two species of Ramularia are described as new *R. destructans* and *R.*

panacicola. These are parasitic on the roots of ginseng, apparently no other species of Ramularia ever having before been described as parasitic on roots of any host. Both species produce chlamydospores abundantly. [See Bot. Absts. 1, Entry 1034.]—*H. M. Fitzpatrick.*

MYXOMYCETES

792. Sumstine, D. R. **Fungi of Chautauqua County, New York.** New York State Mus. Bull. 197: 111–118. 1917. [See Bot. Absts. 1, 786.]

FLAGELLATES

793. Schaeffer, Asa A. **A new and remarkable diatom-eating flagellate, Jenningsia diatomophaga nov. gen., nov. spec.** Trans. Amer. Microsc. Soc. 37: 177–182. *Pl. 13.* 1918.—This new and exclusively holozoic member of the Euglenineae is described from near Knoxville, Tennessee. So far as observed the food of this flagellate consists entirely of living diatoms, which are captured in a truly predatory manner while moving. Locomotion, structure of cell, asexual reproduction, and feeding habits are discussed.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

[Unsigned abstracts are by the editor.]

794. Ashe, W. W. **Additions to the arborescent flora of North Carolina.** Jour. Elisha Mitchell Sci. Soc. 34: 130–140. 1918.—The author records several additions to Coker and Totter's recently published "Trees of North Carolina." The additions include descriptions of a new species of *Hicoria*, two new species and one new variety of *Amelanchier*, and several new combinations.

795. Beauverd, Gustave. **Esquisse synécologique comparative de deux marais des environs de Baulmes.** Bull. Soc. Vaud. Sci. Nat. 52: 17–93. 1918.—The author presents a general discussion of the flora of the region concerned, mainly from an ecological standpoint, gives a list of the species represented, and characterizes about a dozen new varieties and forms of endemic flowering plants.

796. Blake, S. F. **Further new or noteworthy Compositae. New spermatophytes collected in Venezuela and Curaçao by Messrs. Curran and Haman. New plants from Oaxaca.** [Three separate titles.] Contrib. Gray Herb. Harvard Univ. New Ser. 53: 23–65. *Pl. 1, fig. 1–14.* 1918.—In the first paper the author describes a new species of *Aphanostephus* from Texas, one of *Diplostephium* and one of *Verbesina* from Colombia, one of *Liabum* from Gautemala, and one of *Cirsium* from Oregon. New combinations appear under *Steiractinia* and *Gynoxis*. The second article records the results of a study of a collection of plants made in Venezuela and on the Island of Curaçao during the spring and summer of 1917. Seventeen species are described, distributed among several genera, and two genera are characterized as new to science, namely, *Hecatostemon* of the Flacourtiaceae and *Oxycarpha* of the Compositae. *Wikstroemia* Schrad. is recognized as a valid generic name and to it are transferred thirty-one species, mostly from *Haemocharis*, *Laplacea*, and *Lindleya*. Under the third title the author places on record the results of studies of a collection of plants made in Oaxaca, Mexico, by Messrs. Conzatti, Reko, and Makrinius in 1917. Thirteen new species of flowering plants, belonging to several different genera, are described, and one new genus (*Schismocarpus*) of the Loasaceae is proposed.

797. Cockerell, T. D. A. **Notes on the flora of Boulder County, Colorado.** Torreya 18: 177–183. 1918.—Additions to the phanerogamic flora of Boulder County are listed with notes

on several species. *Heliomeris* of Nuttall is recognized as of generic rank, and to it are referred eight species and one variety. New combinations also occur under *Oxytropus*.

798. Heimlich, Louis Frederick. **The trees of White County, Indiana, with some reference to those of the state.** Proc. Indiana Acad. Sci. 1917: 387–471. *Pl. 1–32.* 1918.—Sixty-two species of trees are recorded from White County, as contrasted with one hundred and twenty-five from the entire state. The paper is illustrated with distribution maps and several line drawings.

799. Macbride, J. Francis. **New or otherwise interesting plants, mostly North American Liliaceae and Chenopodiaceae.** Contrib. Gray Herb. Harvard Univ. New Ser. 53: 1–22. 1918.—The present paper embodies the results incidental to a study of several collections of plants, chiefly from western North America. New species are described in *Tricyrtis*, *Atriplex*, *Lotus*, *Lomatium*, *Lycium*, and *Cirsum*. A few new varieties are also characterized, and several new combinations have been made, particularly in *Zygadenus*, *Atriplex*, *Madhuca*, and *Lycium*.

800. Piper, C. V. **New plants of the Pacific Northwest.** Proc. Biol. Soc. Washington 31: 75–78. 1918.—Piper describes the following species as new to science: *Epilobium cinerascens*, *Vaccinium coccineum*, *Mertensia bella*, *Castilleja indecora*, *Grindelia Andersonii*, and *Hoorebekia curvata*.

801. Schneider, Camillo. **Notes on American willows. II. The species related to Salix glauca L.** Bot. Gaz. 66: 318–353. 1918.—The present paper is concerned with a discussion of *Salix glauca* L. and its immediate allies, a group consisting of ten species, including two new ones (*S. fullertonensis* and *S. anamesa*), and several varieties.

802. Schönland, S. **A summary of the distribution of the genera of South African flowering plants.** Trans. Roy. Soc. S. Afric. 7: 19–58. 1918.—This paper consists of an enumeration of the genera of South African flowering plants with brief notes on their geographical distribution.

803. Blake, S. F. **A revision of the genus Viguiera.** Contrib. Gray Herb. Harvard Univ. New Ser. 54: 1–205. *Pl. 1–3.* 1918.—This paper is concerned not only with a revision of the genus *Viguiera*, but it includes a general discussion of the natural relationship of several closely related genera of helianthoid Compositae; and from rather extended comparative studies the author proposes a rearrangement of certain genera of this group. *Viguiera*, as here circumscribed, is made somewhat more inclusive than formerly understood, mainly by combining with it several species hitherto referred to *Gymnolomia*. The genus *Viguiera* is divided into three subgenera, namely *Amphilepis*, a group of twelve Mexican species, *Calanticaria*, to which are referred one hundred and twenty-four species ranging in distribution from the United States to Argentina and Brazil, and *Yerbalesia*, a small group of five species confined to Paraguay, Uruguay and adjacent Argentina. In addition to these there are two little known species of doubtful affinity. Altogether one hundred and forty-three species of *Viguiera* are recognized, and of these twenty-eight are new to science. Several new varieties are also described, and a relatively large number of new names and new combinations have been made, as would naturally result from a critical study of such a large and widely distributed group of plants. A list of the exsiccatae cited and a complete index of accepted names, synonyms, etc., add materially to the usefulness of the work.

804. Cockayne, L. **Notes on New Zealand floristic botany, including descriptions of new species, &c. (No. 3).** Trans. and Proc. New Zealand Inst. 50: 161–191. *Pl. 9, 10.* 1918. —In addition to critical notes on New Zealand plants, new species are described in the following genera: *Carmichaelia*, *Cassinia*, *Epilobium*, *Haastia*, and *Veronica*.

805. FERRIS, ROXANA STINCHFIELD. **Taxonomy and distribution of Adenostegia.** Bull. Torr. Bot. Club 45: 399–423. *Pl. 10–12.* 1918.—The author presents a revision of this west American genus, tracing its distribution from southeastern Montana and Washington to northern Mexico. Twenty-one species are recognized of which five are described as new to science.

806. MAIDEN, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 4, *P. 93–110, pl. 140–143.* William Applegate Gullick: Sydney, 1918.—This number contains descriptions and illustrations of *E. redunca* Schauer, *E. accedens* W. V. Fitzgerald, E. *cornuta* Labill., and *E. Websteriana* Maiden. *Ibid.* Part 5, *P. 111–135. Pl. 144–147.* 1918. Contains descriptions and illustrations of *E. Lehmanni* Preiss, *E. annulata* Benth., *E. platypus* Hook., *E. spathulata* Hook., *E. gamophylla* F. v. M., and *E. argillacea* W. V. Fitzgerald.

807. NIEUWLAND, J. A. **Heterothrix (B. L. Robins.) Rydb. a synonym, and other notes.** Amer. Mid. Nat. 5: 224–225. 1918.—The author proposes the generic name ***Pennellia*** to replace *Heterothrix* Rydb., not Muell. Arg.

808. PAU, C., AND C. VICIOSO. **Plantas de Persia y de Mesopotamia.** Trab. Mus. Nac. Cienc. Nat. Madrid. Ser. Bot. Num. 14: 1–48. *Pl. 1–5.* 1918.—The authors present a list of flowering plants and ferns, collected in 1899 in Persia and Mesopotamia; the list includes descriptions of about forty species and several varieties of flowering plants characterized as new to science.

809. PETRIE, D. **Descriptions of new native flowering-plants.** Trans. and Proc. New Zealand Inst. 50: 207–211. 1918. Four new species and one variety are described in *Myosotis*, one new species in *Pterostylis*, and one in *Poa*—all are from New Zealand.

810. ROBINSON, B. L. **I. Diagnoses and notes relating to tropical American Eupatorieae. II. A descriptive revision of the Colombian Eupatoriums. III. Keyed recensions of the Eupatoriums of Venezuela and Ecuador.** [Contrib. Gray Herb. Harvard Univ. New Ser., No. LV.] Proc. Amer. Acad. 54: 235–367. 1918.—Article I contains descriptions of thirty-seven species and seven varieties of ***Eupatorium*** new to science; the species are distributed as follows: twenty-one from Colombia, seven from Venezuela, two from Mexico, two from Panama, and from Guatemala, Jamaica, Porto Rico, Santo Domingo and Ecuador one each. A new species of ***Fleischmannia*** and one of ***Kuhnia*** from Mexico are included. Article II consists of a critical revision of the Eupatoriums of Colombia. Ninety-three species and several varieties are recognized. The group is keyed to sections, and there is a key to the species of each section. A lucid description is given of each species, and this is followed by bibliography and the citation of exsiccatae. Article III is a similar presentation of the Eupatoriums of Venezuela and Ecuador. Thirty-four species are recognized from Venezuela and fifty from Ecuador.

811. ROLFE, R. A. **Gongora latisepala.** Curtis's Bot. Mag. *Pl. 8766.* 1918.—A new species of orchid indigenous to Colombia, described and illustrated from plants grown at the Royal Botanic Gardens, Kew, England.

812. SARGENT, C. S. **Notes on North American trees. II. Carya.** Bot. Gaz. 66: 229–258. 1918.—The author gives a conspectus of the species of hickory occurring in the United States, recognizing fifteen species and a number of varieties and forms several of which are new to science. An enumeration of the supposed hybrid hickories is also included and to some of these new binomial names have been assigned.

813. SCHNEIDER, CAMILLO. **Notes on American willows. I. The species related to Salix arctica. Pall.** Bot. Gaz. 66: 117–142. 1918.—This paper is concerned with a discussion of *Salix artica* Pall. and its immediate allies, involving six species. Several new varieties and forms are characterized.

Vol. I DECEMBER, 1918 No. 4

ENTRIES 814–1140

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for the remainder of volume 1 and also for the first three issues of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2, although they are shown on cover page 1 of present issue.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Other changes will be reserved till the end of the present volume. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any editor.

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The Johns Hopkins University, Baltimore, Maryland

Vol. I | DECEMBER, 1918 | No. 4

ENTRIES 814–1140

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

[Unsigned abstracts are by the editor.]

814. CLUTE, WILLARD N. **Botany laboratory equipment.** School Sci. Math. 18: 492–494. June, 1918 —Something seems to be the matter with botany, it will soon come to an end in school through sheer inanition. Registration in the study has gone down 50 per cent in ten years. Botany should have a more practical turn. Too many classes are still engaged in flower analysis, others give too much time to morphology and the alternation of generations. Public demands information about food, fiber and other economic plants. There should be a collection of plants growing in the open, supplemented by a greenhouse. A museum of plant products is also desirable. Frequent field trips must be conducted. General science threatens to include the cream of botany; should this succeed special botany instruction will follow the lepidodendron into oblivion.—*Gundersen.*

815. SHINN, HAROLD B. **Biology in the high school of tomorrow.** School Sci. Math. 18: 495–499. June, 1918.—Too often discussion of a school question passes into destructive criticism of everything and everybody. In high school botany there is no room for long discussions of algae, ferns or mosses; there should be more planting and care of house plants and grounds. Corn may be studied as intensively as Huxley's crayfish. Biology will become economic, but not mercenary. The commercial courses of today are not educational because their ideal is the dollar. Botany will teach soil fertilization, sterilization and inoculation. There will be more work with forestry, pruning, grafting and breeding. In zoology the study of mammals will be emphasized. High school botany and zoology have advanced quite beyond that of the university, which is now a drag on the high schools. The future text will be written by an advanced high school teacher and the universities will cease to impose their neomonastic training.—*Gundersen.*

816. HOLT, VESTA. **Agriculture or botany, which?** School Sci. Math. 18: 505–506. June, 1918.—Botany, as a high school subject, has been in a fair way to be laid on the shelf alongside of astronomy, as not practical. A course in "agricultural botany" proved a success in the Medford, Oregon, High School. The chief industry of the region was fruit raising. Forms of plant life were studied giving attention to physiology, growth and environment. Seed germination, soils, plant pathology, grafting, and plant breeding were then taken up. Also a soil survey with samples, and a collection and study of weeds.—*Gundersen.*

817. NESS, H. **Agricultural text-books for our public schools.** Science 48: 484–486. Nov. 15, 1918.—Agriculture, as a subject in our public schools, will fail to educate and enter-

tain if heavily burdened with dry recipes for increasing the number of dollars, or lectures upon more physical operations of running a farm. The highly interesting biological, chemical and physical principles underlying these operations would, however, not fail to stimulate and elevate the young mind, as adding interest to the operations in themselves. The language, too, in which these subjects are taught, should be in a simple, yet good virile English. In the greater number of these " text-books on agriculture for the public schools," the pupils are expected to cover more agricultural subjects, frequently crowded together in an incoherent way and stripped of all philosophical connective tissue, than any student in the state agricultural colleges, where he has a four year's course with specialists for teachers, supplied with all the equipments for demonstration. Author urges a return to the idea of " a book about agriculture " and giving up the idea of " productive agriculture " for our public schools.

818. Kirkwood, J. E. **Opportunity and obligation in botanical teaching.** School Sci. Math. **18**: 580–587. Oct., 1918.—Systematic botany for years was the main subject of botanical study and teaching. As the whole of botany consisted in the naming of plants it led to no economic benefit nor to education of cultural value. Laboratory physiology and morphology came as the next stage. The present tendency is toward practical considerations. Scientific agriculture, forestry, pharmacy and bacteriology are closely allied to botany. In the work of the plant breeders lie inconceivable possibilities for food production. The importance of plant pathology is not realized. No line of teaching has greater possibilities than that which deals through the life of plants with the products of the soil. The knowledge of the dependence of human life on plants has a fundamental educational value.—*Gundersen.*

ECOLOGY

H. C. Cowles, *Editor*

[Unsigned abstracts are by the editor.]

819. Andrews, E. F. **The relation between age and area in the distribution of plants.** Science **47**: 142–143. Feb. 8, 1918.—The author, agreeing with Sinnott that other factors than age help to determine the area occupied by a species, notes that the recently naturalized *Lonicera japonica* now has a wider area in the southeastern states than the native longleaf pine. Furthermore this recent immigrant, unlike most introduced weeds, is not confined to cultivated fields and waste places, but invades woodlands and ravines from the sea level to the mountain tops.

820. Bakke, Arthur L. **Determination of wilting.** Bot. Gaz. **66**: 81–116. *5 figs.* Aug., 1918.—Using the hygrometric paper method of investigating transpiration, data are obtained demonstrating the fact that permanent wilting is a definite physiological condition and that the time of its occurrence may be exactly and readily determined by observing the fluctuations of the index of foliar transpiring power. As the time of permanent wilting approaches, the index of transpiring power is considerably lowered, it remains at or near equilibrium for a definite period and then undergoes a decided but rather slight rise. For interpreting these fluctuations the conception of continuous water columns within the plant is assumed and in the condition of equilibrium these columns are supposed to be in a state of highest possible tension. Then the transpiration exerts a force sufficient to cause the serious rupture of the water columns and permanent wilting occurs at the instant of such rupture, being indicated by a slight increase in transpiring power caused by the lessened resistance to the outward passage of water following the break of the water columns. It is suggested that the duration of the period of equilibrium may give a measure of the drought resistance of different plants. Permanent wilting is also shown to occur earlier in older leaves, the time interval varying according to age.

Graphs of the daily march of foliar transpiring power show that the maximum occurs earlier in the day than the maximum evaporating power of the air, and that the maximum is

followed by a decided fall and subsequent recovery, the second maximum being usually somewhat smaller than the earlier one. Helianthus plants were used in this investigation which was conducted in the laboratories of the University of Chicago.—*Geo. D. Fuller.*

821. Blodgett, F. H. **Weather conditions and crop diseases in Texas.** Mem. Torr. Bot. Club **17**: 74–78. June, 1918.—Suggests that organisms commonly regarded as most sensitive to substratum, such as parasitic fungi, mosses and hepatics, may respond to local weather conditions. Proof is offered that *Glomerella Gossypii* Edg. responded to distribution and periodicity of rainfall in Texas, as illustrated on a greater scale than is usually possible by the condition of cotton. Winds may also carry infection, possibly as far as 20 or 30 miles; and it is suggested finally that application of possibly infected irrigation water is still another source of danger.—*Norman Taylor.*

822. Campbell, D. H. **The Origin of the Hawaiian flora.** Mem. Torr. Bot. Club **17**: 90–96. June, 1918.—The evidence of Wallace, Guppy, and others who have shown that the flora of Hawaii is largely endemic and of Asiatic rather than American affinities, is here supplemented from a study of hygrophilous liverworts and filmy ferns. The latter, because of their rain-forest habit, are not suited to overseas transportation, and must according to the author have existed in Hawaii since its connection with some mainland, now under the sea. Plants of this type now existing show relationship with Java and the Malayan region and Australasia rather than America. So greatly is this true that of 40 species of Pteridophytes, 38 are found in Hawaii and Australasian-Malaysian regions but not in America, while only two are found in Hawaii and America but not in the Orient. Other evidence, such as the essential continuity of shallows between Hawaii and the East, and the great deeps between those islands and America are noted, and the article closes with a tabulation of flowering plants, based on Hillebrand, showing 45 Hawaiian-Australasian-Malaysian, but not American genera and 7 of Hawaiian-American distribution but not Australasian-Malaysian.—*Norman Taylor.*

823. Dunnewald, T. J. **Vegetation as an indicator of the fertility of sandy pine plains soils in northern Wisconsin.** Jour. Amer. Soc. Agron. **10**: 19–23, *1 fig.* Jan., 1918.—In making a soil survey of a proposed Forest Reserve area in northern Wisconsin, it was noticed that cut-over sand plains differ widely in the character of their second growth. In the most sandy portions, there is but a sparse second growth of trees, the ground being covered largely by Vaccinium, Pteris, and Myrica; the trees where present are largely *Pinus resinosa* and *P. Banksiana* Where the sand is more loamy, there is a good second growth of various trees including *Pinus Strobus*. It is concluded that the character and size of the plants of cut-over lands is a safe indicator of agricultural values. "The heavier growth indicates a higher content of plant food, the presence of more fine material in the soil, and especially a greater capacity of the soil to retain moisture and to enable vegetation and future crops to resist periods of drought." [Abst. in Exp. Sta. Rec. **39**: 115–116. 1918.]—*H. C. Cowles.*

824. Farrow, E. Pickworth. **On the ecology of the vegetation of Breckland. I. General description of Breckland and its vegetation. II. Factors relating to the relative distribution of Calluna heath and grass heath in Breckland. III. General effect of rabbits on the vegetation. IV. Experiments mainly relating to the water supply. V. Observations relating to competition between plants. VI. Characteristic bare areas and sand hammocks.** Jour. Ecology **3**: 211–228. *4 fig. 3 pl.* Dec., 1915. *Ibid.* **4**: 57–64. *1 fig. 3 pl.* June, 1916. *Ibid.* **5**: 1–18. *1 fig. 6 pl.* Mar., 1917. *Ibid.* 104–112. *1 fig. 2 pl.* June, 1917. *Ibid.* 155–172. *2 fig. 1 pl.* Dec., 1917. *Ibid.* **6**: 144–152. *3 pl.* June, 1918.—Situated in Norfolk and Suffolk counties, England, upon sandy soil with only 22½ inches of annual rainfall there is an area developing a vegetation consisting of a transition from a heath, dominated by *Calluna vulgaris*, to a grassland with a short close turf in which *Festuca ovina* and *Agrostis vulgaris* are the most abundant species. Attempts at cultivation have not proved successful and the native vegetation constitutes the nearest approach to continental steppe conditions to be found in Great Britain.

Investigating the effects of a rabbit population on the vegetation Farrow has shown that the presence and the activities of these animals constitute a cause of retrogression sufficient at

times to change a pine forest through Calluna heath and *Carex arenaria* associations to a dwarf grass or a Cladonia heath. Experiments with irrigation and with the application of manure tend to show that both sterile soil and lack of soil moisture are factors in limiting the rate of growth and the luxuriance of the vegetation. This increased growth with improved conditions results in a decrease in the number of species in the area, since the more rapid growth of certain plants like *Agrostis vulgaris* smothers less vigorous ones, such as *Festuca ovina*. Evidence is also presented that such plants as *Pteris aquilina* and Pinus often succeed in competition owing to their dead foliage excluding the light from their competitors causing etiolation and decay. Often the retrogression begun by rabbits is continued by sand blasts and the retrogression shows exactly the reverse order of the succession inaugurated by irrigation, being particularly noticeable in the *Agrostis vulgaris* giving place to *Festuca ovina* wherever the sand blast becomes intensive. Once initiated, bare areas tend to increase, the sand assisting in destroying the vegetation both by direct attack and by removing the substratum, leaving clumps of grass upon the tops of small hummocks which are being constantly undermined. With the checking of wind erosion in such bare areas Polytrichum and Cladonia become agents of stabilization and revegetation. [Rev. by Fuller in Bot. Gaz. 67: 181–182. 1919.]—*Geo. D. Fuller.*

825. Fink, Bruce. **The distribution of fungi in Porto Rico.** Mycologia 10: 58–61. Mar., 1918. In a two months' collecting trip in the winter of 1915–16 it was noted that the rusts, imperfect fungi, black Perisporiaceae, crustose lichens, pyrenomycetes, and Hysteriaceae are abundant. Foliose and fruticose lichens are relatively infrequent. The larger basidiomycetes are strikingly infrequent.—*H. C. Cowles.*

826. Gleason, H. A. **Local distribution of introduced species near Douglas Lake, Michigan.** Torreya 18: 81–89. May, 1918.—A continuation of earlier studies (Bull. Torrey Bot. Club 41: 511–521. 1914) and a confirmation of them. Introduced species seem unable to persist, in competition with native ones, the further removed they are from source of local introduction. This is evidenced by the loss in three years of many introduced species at a summer resort, among the aspens (where, however, those species that survived spread somewhat), and in hardwood clearings. In the latter many 1914 inhabitants died out and were replaced by a new crop of weeds in 1917. 25 species were common to both years and presumably more likely to endure later on. Methods of introduction are dealt with, such as travel through the forest, horse-dung, and otherwise. Concluding notes on behavior of certain introduced species, such as rate of increase, sudden exhaustion, a complete disappearance of unstable ones, confirm general ideas of the precarious and evanescent nature of much introduced vegetation.—*Norman Taylor.*

827. Harper, R. M. **The vegetation of the Hempstead Plains.** [Long Island, N. Y.]. Mem. Torr. Bot. Club 17: 262–286. *3 fig. 1 pl.* June, 1918. A description of an area designated by the writer as a prairie, but not certainly assignable to this vegetation type by others. It is now about 10 square miles in extent and essentially treeless. Soil is mostly sand and pebbles, perhaps outwash watered from the terminal moraine just to the north.—The vegetation is listed according to the frequency of the 4 trees, 11 shrubs, 40 herbs, and 3 cryptogams, which the author credits to the open plains. Of the herbaceous vegetation, dominated by *Andropogon scoparius*, the estimated yield per acre, when cut in October was 8220 pounds,—air dried 5975 pounds. As showing the influence of water in changing the vegetation a census of the species of the valley of Meadow Brook, which used to flow through the plains but is now nearly dry, lists 15 woody species, 51 herbs and a moss,—nearly, but not quite all different species from those of the plains. There is also a description of a curious "island of trees," dominated by *Pinus rigida*, found in the open plains; some speculation as to the origin of the vegetation of the area and its affinities with other regions in the eastern United States. Fire may have played its part in determining the present condition of the vegetation; and the author points out the probable rapid destruction of a unique type of vegetation within a few years, due to its being the site of Camp Mills and to other causes.—*Norman Taylor.*

828. HARRIS, J. ARTHUR. **On the osmotic concentration of the tissue fluids of desert Loranthaceae.** Mem. Torr. Bot. Club 17: 307–315. June, 1918.—Three species of Phoradendron growing upon a number of different hosts in the Arizona deserts have been investigated and the osmotic concentration of the tissue fluids are found by the freezing point method to be approximately twice as great as that of related species growing in the montane rain forests of Jamaica. The osmotic concentration of the tissue fluids of these desert parasites is generally greater than that of the host, a typical example showing the average concentration of the former to be 28.63 and of the latter 24.50 atmospheres.—*Geo. D. Fuller.*

829. HARRIS, J. ARTHUR. **On the osmotic concentration of the tissue fluids of phanerogamic epiphytes.** Amer. Jour. Bot. 5: 490–506. Nov., 1918.—Investigation of the osmotic concentration of the tissue fluids of epiphytic Bromeliaceae, Orchidaceae, Piperaceae, and Gesneraceae from the montane rain forests of Jamaica and from the subtropical forests of Florida show that the osmotic concentrations of the species from the former habitat is lower than that from the latter. In both regions the osmotic concentration for the epiphytes is lower than that of terrestrial vegetation. In the Jamaican forests the epiphytes show from 37 to 60 per cent of the concentration characteristic of herbaceous terrestrial vegetation and from 28 to 45 per cent of that of ligneous terrestrial plants.—*Geo. D. Fuller.*

830. HAZEN, T. E. **The trimorphism and insect visitors of *Pontederia cordata*.** Mem. Torrey Bot. Club 17: 459–484. *12 fig. 2 pl.* June, 1918.—Examination of many plants shows that *Pontederia cordata* has three distinct types of flowers (*1*) short-styled, with the longest and mid-length stamens protruding, (*2*) mid-styled, with only the long stamens protruding, (*3*) long-styled, mid-stamens only just protruding. In (*3*) the style is itself exserted, in (*2*) only very slightly so, and not at all in (*3*). "The ratio of the average length of the long pistils to that of mid-length pistils is approximately as 100 to 60; and the average height of the long pistils to that of the short ones is as 100 to 22." This trimorphism may obviously result in six legitimate crosses between six sets of stamens and the three different lengths of pistils, which is illustrated by a diagram. The different style lengths are found on different plants, which show some tendency to make locally exclusive growths. Insect visitors recorded are 10 Lepidoptera, 4 Hymenoptera, 1 Diptera, and perhaps others. Self pollination is probably possible but rare, a constant procession of insects insuring almost universal cross-pollination. The author also records that *Pontederia cordata* at Arcola, N. J., where the studies were made, is, contrary to usual notions, found in a place that is "daily bathed or even flooded by tide water." [Rev. by Wylie in Bot. Gaz. 67: 271–272. 1919.]—*Norman Taylor.*

831. HOUSE, H. D. **Vegetation of the eastern end of Oneida Lake** [N. Y.]. Bull. for 1917, New York State Museum 197: 61–71. May, 1918. [Illus.]—A description of Geology, Climate, Life Zones, Forests, Shore-vegetation, etc. with lists of species given for some of the plant associations.—*Norman Taylor.*

832. MACCAUGHEY, V. **Strand Flora of the Hawaiian Archipelago. I. Geographical relations, origin and composition.** Bull. Torrey Bot. Club 45: 259–277. July, 1918.—After discussion of geographical isolation of the islands, and tremendous deeps that occur in the sea near them, ocean currents are shown to be more effective from America than the Old World, as a possible source of strand colonizers. Methods of introduction as outlined by Schimper, Wood-Jones, Tansley and Fritsch, Hooker, Mosely, and Guppy are dealt with, and the peculiarly endemic nature of the Hawaiian strand flora, is emphasized. The latter is the remarkable feature of the flora of the strand, which in most oceanic islands is nearly cosmopolitan. Of interest is the fact that sea-borne colonists of the Hawaiian strand are at least partly of American origin, while the pteridophytes of the interior (see Bot. Absts. 1, Entry 822) rainforest, not at all suited to oversea transportation, are only very slightly so. Thirty-two species are listed as endemic littoral or practically littoral plants which may well exceed that from any other region in the world. With only something over 80 species recorded from the strand these 32 endemics are extraordinary. Of these, 13 are woody plants and 19 herbs,

suggesting that woody species do not outnumber herbaceous ones in this strand element of the Hawaiian endemics, contrary to the percentages for the total endemics of the islands as given by Sinnott and Bailey (Ann. Bot. 28: 574. 1914).—*Norman Taylor.*

833. Nichols, George E. **The vegetation of northern Cape Breton Island, Nova Scotia.** Trans. Connecticut Acad. Arts and Sci. 22: 249–467. *70 figs.* 1918.—This island, lying between 45.5 and 47 degrees North lat., possesses upon the lowlands along the coast a climax forest of the deciduous type, in which *Fagus grandifolia, Acer saccharum,* and *Tsuga canadensis* are dominant. In contrast to this, the granitic uplands constituting the whole interior of the island display as a climax vegetation a coniferous forest composed of *Abies balsamea, Picea canadensis* and a small amount of *Betula papyrifera.* The successions leading to these forests are traced and the relationships of the two climax types are considered. They appear to be equally mesophytic as shown by similar species in the undergrowth, in which *Taxus canadensis, Acer spicatum, A. pennsylvanicum,* and *Sorbus americana* are the principal shrubs, while among the herbaceous vegetation are *Phegopteris spp., Aspidium* spp., *Clintonia borealis, Linnaea borealis, Cornus canadensis, Actaea alba,* and *Viola canadensis.* Upon the destruction of the deciduous forest of the lowlands by cutting or fire it is succeeded by one in which Abies and Picea are dominant. This and the presence of considerable numbers of Abies of small size in the deciduous forest raises the question of why the balsam fir is apparently unable successfully to compete with the beech and maple. Nichols finds that its seedlings are fairly tolerant of shade and that its failure is due to its shortness of life, reaching maturity in about a century, and to its susceptibility to fungous diseases.

The factors in regard to which the upland climate differs from the lowland appear to be the greater extremes of temperature in the former situation and the fact that the uplands which have an average elevation of 1000 feet are frequently enveloped in fog and low-hung clouds which are absent below. Large areas of the more exposed upland have an aspect similar to the tundra due to the degeneration of the conifer forest to a "Krummholz," a coniferous heath and even to a shrub heath. These associations constitute "the barrens" which Nichols regards as possessing an edaphic rather than a climatic vegetation.

Several problems are elucidated, especially those connected with bogs. The sphagnums are placed in five ecological classes ranging from aquatic to comparatively xerophytic in habit. The mesophytic and xerophytic types are cushion-forming and through their agency numerous raised bogs are developed. These seem equivalent to the "Hochmoor" of Europe and seem to require for their development a climate characterized by abundant precipitation, relatively low atmospheric humidity, cool summers, and the absence of the extremely low winter temperatures found on the mainland. Among the more important edaphic factors, an impervious substratum stands first and is afforded by the glaciated granite surface. This assists in the retention of the water supply which comes exclusively from rain and not from springs. The cushion-forming sphagnums, coming in during the later stages of bog development, result in a convex surface, the central portion of the bog often rising from 5 to 15 feet above its margin. This surface is hummocky, rather firm and springy and usually relatively dry. In addition to the sphagnums its vegetation consists of such other mosses as Polytrichum and Racomitrium, and some fruticose lichens such as *Cladonia* spp., small ericaceous shrubs and scattering, very stunted individuals of *Picea mariana* and *Larix laricina.* Among other details is the description of subsequent bog ponds formed by the impervious sphagnum peat damming back the water draining down gentle rock slopes. These also act as reservoirs for the rainfall insuring to adjacent areas a constant supply of moisture throughout the season.

In arranging the various plant communities, Nichols uses a new scheme of classification in which the association is the fundamental unit. The association complexes constitute edaphic formations and these in turn make up climatic formations.—*Geo. D. Fuller.*

834. Nichols, Geo. E. **The sphagnum moss and its use in surgical dressings.** Jour. New York Bot. Gard. 19: 203–220. Sept., 1918.—While the primary purpose of this paper is indicated in the title, it contains notes on the ecology of Sphagnum, some details of its struc-

ture, and descriptions of the peculiarities of various species. The distribution of various types of bogs in Maine and in the eastern provinces of Canada is briefly sketched.—*Geo. D. Fuller.*

835. PETRY, LOREN C. **Studies in the vegetation of New York State. II. The vegetation of a glacial plunge basin and its relation to temperature.** Bull. Torr. Bot. Club **45**: 203–210. *3 fig.* May, 1918.—In certain rock basins of glacial origin near Syracuse, N. Y., very low temperatures of both soil and air prevail throughout the year, the differences between the rim and bottom of the depressions often amounting to as much as 15°C. These low temperatures are shown to be the controlling factors in causing the presence of plant associations characterized by the dominance of plants usually found only in much more northern habitats. Their local distribution is shown to coincide very exactly with the areas bounded by the isothermal lines of low temperature. [Rev. by Fuller in Bot. Gaz. **67**: 184. 1919.]—*Geo. D. Fuller.*

836. PITTIER, H. **Our present knowledge of the forest formations of the Isthmus of Panama.** Jour. Forestry **16**: 76–84. Jan., 1918.—"This is a brief account of some results of the study of the flora of Panama made in connection with the general biological survey organized by the Smithsonian Institution." More than half of the country is covered by forests, most of the remaining territory being savanna. Most of the forests are primeval and to be classed as rain-forests, with a dominance of mesophytic dicotyledonous trees. Cauliflory and plank roots are common, and the trees are conspicuously arranged in tiers. Monsoon forests occur on the Pacific slope, *Cavanillesia platanifolia* being everywhere characteristic. [Unsigned rev. in Geographical Review **5**: 417. 1918.]—*H. C. Cowles.*

837. SMITH, WM. G. **The distribution of Nardus stricta in relation to peat.** Jour. Ecol. **6**: 1–13. *2 pls. 1 map.* Mar., 1918.—This grass is widely distributed on moor and heath in many parts of Europe, the present study being made in the hilly parts of northern Britain. Here it forms the dominant member of a plant association marginal to areas of retrogressive peat. It typically occurs upon material that has been redistributed from exposed and elevated masses of peat through the agency of water, wind, or other factors. This community is relatively fixed, fairly extensively developed, and forms a rather important although somewhat unproductive part of the grazing lands in the subalpine region of the central and northern hills of Britain. The usual composition of the association is determined and the effect of such factors as spring water, manuring, grazing, and burning is investigated.—*Geo. D. Fuller.*

838. TAYLOR, NORMAN. **A quantitative study of Raunkiaer's growth-forms as illustrated by the 400 commonest species of Long Island, N. Y.** Mem. Brooklyn Bot. Gard. **1**: 486–491. 1918.—Upon grouping the species for (*1*) the vicinity of New York, (*2*) the whole flora of Long Island and (*3*) the 400 commonest plants upon Long Island, according to Raunkiaer's scheme the resulting spectra show a rather remarkable agreement. Quite as remarkable is their divergence from the normal spectrum especially in the percentage of herbaceous plants. This leads to the conclusion that the normal spectrum is probably in error and that further study will probably lead to its readjustment.—*Geo. D. Fuller.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

[Unsigned abstracts are by the editor.]

839. ASHFORD, W. G. **The Forest Policy in New South Wales.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. P. 22–24.—The fundamental requirements of State Forestry are (*1*) Stable and expert management; (*2*) Assured certainty of policy; (*3*) A fixed system of finance. The 1916 Act granted to New South Wales:—(*1*) A State forestry board untrammeled by political action. (*2*) Executive and administrative

powers to establish a settled policy and to maintain continuity. (3) Allocation of 5,000,000 acres of public land as State Forests. (4) Allotment to the Commissioners of 50 per cent of the forestry revenue for re-expenditure on forest works.—A Commission of three is to handle the work of the forests, one of whom is to represent the state proper, one to be a technical forester, and the third to be a business expert. The work will be divided under three heads, that of administration and finance, that of forest management, and that of commercial development. One unified system to result and the handling of the State Forests and of the Crown lands is to be under its control.—Work already under the Commercial Development has resulted in the establishment of two large sawmills, which, in a competitive sale to the Government of 1,250,000 feet of lumber, saved £1,560 to the State over the nearest competitor. The auditor reported that on one year's business, with a turnover of £10,720, a profit of 15 per cent was made after all charges for overhead, interest, depreciation, and profit and loss had been deducted.—*Edw. N. Munns.*

840. GILL, WALTER. **The introduction of the remarkable pine (P. radiata or P. insignis) into South Australia and its successful utilization.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917, 24–26.—The wood of the planted Monterey pine in South Australia has shown itself adapted to all uses such as the white pine (*P. strobus*) has been used in. Various articles of furniture made 25 years ago of the wood of 10-year old trees are still serviceable. Plantations 24, 26, and 30 years of age show that the annual increment of the trees is 160 cubic feet, or 2000 "superficial feet" per acre, 2769 superficial feet, and 2943 superficial feet per acre respectively. The 26-year old stand had a volume of 72,000 superficial feet per acre, and the 30-year old stand one of 88,308 superficial feet per acre. A sawmill established in a 33-year old plantation cut over 100,000 superficial feet per acre, an annual increment of 3030 feet. The wood is used for boxing and for house construction.—*Edw. N. Munns.*

841. HOWARD, ALBERT. **Recent investigations on soil-aeration. Part I. With special reference to agriculture.** Indian Forester 44[5]: 187–202. May, 1918. An abridgment is given of the recent work of a number of investigators on the influence of aeration on plant life. This is shown in the rate of growth, the quality of the product produced, and in the distribution of plants.—*Edw. N. Munns.*

842. HOLE, R. S. **Recent investigations on soil-aeration. Part II. With special reference to Forestry.** Indian Forester 44[5]: 202–212. May, 1918. A study of the factors influencing germination and seedling development of the sal, *Shorea robusta*, revealed that soil-aeration was of primary importance. Soils with poor drainage and in which the amount of CO_2 increased rapidly, caused the death of the small trees. Soil-aeration was found to depend upon the amount of water in the soil, the amount of organic matter present, the number and kind of soil organisms, and the rate at which currents of air, or water with oxygen in solution, penetrate into and percolate through the soil. Ordinary forest operations can control these factors without drainage through the density of shade and amount of organic matter, the use of fire and earth and similar means. The sal root-fungus, *Polyporus shoreae*, is most destructive in badly aerated soils, and limits the sal to the well drained sandy or gravelly lands. Dense growth of grass in a forest may cause the rain water to become heavily charged with CO_2 and influence the rate of growth to a great extent.—*Edw. N. Munns.*

843. JOLLY, N. W. **Araucaria cunninghamii—The hoop pine.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. *P. 92–94.*—A silvical description of the hoop pine in Australia. The distribution, development, and habitat are described and some data on the rate of growth are given. Annual shoots of 10 feet have been recorded for some trees and diameter increments of 1½ inches and over per annum. Reproduction is by both seed and coppice, and, though the latter is strong, it is not vigorous enough to be used in forest management. Natural reproduction must be assisted by suitable soil conditions, an overhead shelter, fire protection, and finally by the later removal of the shelterwood. The enemies of the tree that are of special importance are fire, insect borers, and rodents in the drier localities.—*Edw. N. Munns.*

844. JOLLY, N. W. **Cedrela australis—The red cedar.** Rept. Interstate Conference Forestry. Perth, Nov., 1917. *P. 94–95.*—The habitat, development and silvical characteristics of the tree are described for this important Australian hardwood. Methods of natural reproduction and management of the tree are described which show that it may be handled either by coppice or by seeding. Natural reproduction by seed is difficult because of the ravages of the cedar twig borer (*Hysiphyla robusta*). Scrub wallabies, rats, and opossums do considerable damage.—*Edw. N. Munns.*

845. MACOUN, W. T. **Winter injury to trees, 1917–18.** Canadian For. Jour. 13: 10. Nov., 1918.—The effect of the severe winter of 1917–18 on apple trees is described. Thirteen forms of frost injury are described, the chief form of injury being to trunk or body injuries. The reason ascribed is that the long continued cold weather without thaws caused the trees to lose moisture until they had lost so much that recovery was impossible. Maples, pines, poplars, locusts, oaks, and chestnuts suffered various kinds of injuries. Many exotics were badly injured.—*Edw. N. Munns.*

846. MAIDEN, J. H. **The trees of Western Australia.** Rept. Interstate Conference of Western Australia on Forestry. Perth, Nov., 1917. *P. 11–17.*—This paper is divided into sections on Bibliography, Horticultural value of trees and shrubs, and Eucalypts and minor species.—Under "Bibliography" critical comments of six books on eucalypts are given with lists of some of the important eucalypts of Western Australia. In the second section the value of certain shrubs and trees are described and their cultivation urged.

About 120 species of Western Australia eucalypts are given, the lists being divided into endemic species, those with horticultural value, dry country species, shrubs or small trees not yielding merchantable timber, and tropical trees. Short descriptions of some of the species are given. About 230 species of *Eucalyptus* are now described.—Under minor species it is stated that there are some 500 species of wattles (*Acacia*), most of which are but little known and very poorly represented in the herbaria.—*Edw. N. Munns.*

847. RHOADES, VERNE. **Ice storms in the southern Appalachians.** Monthly Weather Rev. 46^8: 373–4. Aug., 1918.—An account of the effect of an ice storm in 1915 upon forest growth in the North Carolina Mountains. Trees of 16 inches and large branches were broken off while many trees were bent to the ground. [See the next entry.]—*Edw. N. Munns.*

848. ASHE, W. W. **Note on the preceding.** Monthly Weather Rev. 46^8: 374. Aug., 1918.—A comment on conditions is given, in which characteristics of the forest tree species after severe ice storms are portrayed. The dates of these storms can often be calculated from the crooks in the stem at the point of development of new leaders. [See preceding entry.]—*Edw. N. Munns.*

849. RYAN, G. M. **Suggestions to introduce special working plans for the exploitation of Bassia latifolia and Bassia longifolia in India.** Indian Forester 44^7: 291–315. July, 1918.—The corollas of the Bassia trees are of great value as a source of an intoxicating liquor and of food, while the acetone yield is ten times that obtained by the distillation of woods. The acid export for the manufacture of margarine is very large.—The burning of the litter to make the corolla collection easy and to permit the collection of seeds is preventing natural reproduction. Planting for the production of seed and of the corollas is recommended.—*Edw. N. Munns.*

850. SECREST, EDMUND. **Meeting the wood fuel situation.** Ohio Agric. Exp. Sta. Monthly Bull. 3^{10}: [whole no. 34.] Oct., 1918.—Information is given on the value of local species for fuel, and the weights of the woods and their equivalents in coal. Information as to machinery, costs, and methods of preparing wood fuel are presented in a popular manner.—*E. R. Hodson.*

851. SECREST, EDMUND. **War time uses of timber.** Ohio Agric. Exp. Sta. Monthly Bull. 3^{11} [whole no. 35.] Nov., 1918.—Black walnut for gunstocks and airplane propellers was in

great demand and coöperative methods of handling the sales to make car-load shipments are described. Small trees and shade trees were not needed. White ash for airplanes and handles was greatly needed and the care necessary in getting this material without waste is portrayed. Oaks were used for artillery, motor truck, and ship-building purposes, and the locust for treenails. Care of young growth and the plantation of additional trees are urged. —*E. R. Hodson.*

852. SMYTHIES, E. H. **Notes on the dying bark of sal seedlings.** Indian Forester 44^{9}: 420–422. Sept., 1918.—A study of one year old seedlings of sal (*Shorea robusta*) shows that under heavy shade the seedlings continue to die back through both the cold weather and the hot weather. A heavy clearance and removal of shade causes those seedlings which would die back to do so immediately, and at the beginning of the following hot weather, many seedlings which had died back in the cleared area start to grow and persist through the hot weather. On shaded areas this effect does not occur.—*Edw. N. Munns.*

853. SUDWORTH, GEORGE B. **Miscellaneous conifers of the Rocky Mountain region.** U. S. Dept. Agric. Bull. 680. Contrib. from Forest Service. *44 p.* 1918.—Nine species found in the Rocky Mountain region are described in this bulletin. These are *Larix laricina, L. occidentalis, L. lyallii, Tsuga heterophylla, T. mertensiana, Pseudotsuga taxifolia, Libocedrus decurrens, Thuja plicata,* and *Taxus brevifolia.* The generii characteristics of the genera are given, with a botanical description of the various species, the important silvical characteristics and manner of growth, methods of regeneration and sizes of the trees. Keys for the identification of genera and species are given, with a map of North America on which the geographic distribution of the trees is distinctly portrayed.—*Edw. N. Munns.*

854. SWAINE, J. M. **A new forest insect enemy of the white birch.** Canadian For. Jour. 14^{10}: 1928–29. Nov., 1918.—In one section of Quebec 50 per cent. of the *Betula alba* were badly diseased and injured by the bronze birch borer, *Agrilusanxius.* The eggs are laid in the bark in June and girdle the tree. Winter is passed in the larval stage, and the adult leaves in June of the following year. For control measures, the cutting of the tree and its utilization in winter is recommended for small areas. Under present conditions it can not be controlled with any great degree of success on large areas. Yellow birch, *Betula lenta,* is not as seriously affected.—*Edw. N. Munns.*

855. WATSON, H. W. A. **Forestry in Lower Burma.** Indian Forester, 44^{5}: 212–217. May, 1918.—Forest management in the Lower Burma region suffers from the application of the Selective System; the necessity of supplying the plains population with timber; the lack of system or definite end under which the Improvement Fellings are carried out; the uncertainty of the flowering of the Kyathaung bamboo; and the neglect of the "taungya" cutter. Suggestions are given whereby silvicultural methods can be put into effect. The "Uniform System" with regeneration on the French "*Quartier bleu*" system is indicated.—*Edw. N. Munns.*

856. WHITFORD, H. N. **The great timber wealth of South America.** Canadian For. Jour. 13^{8}: 1833–34. Aug., 1918.—A short description of the timber conditions and stands in South America, is followed by an estimate of the area in forests. As yet no lumbering has taken place though there is an area of 130 million acres in merchantable forest with a stand of some 650 billion feet.—*E. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

857. ADAMETZ, L. **Studien über mendelsche Vererbung der wichtigsten Rassenmerkmale der Karakulschafe bei Reinzucht und Kreuzung mit Rambouillets. [Studies on the Mendelian inheritance of the most important racial characters of the Karakul sheep in pure breed-**

ing and in crosses with Rambouillets.] [Review by V. Haecker, from Bibl. Genet. 1. 1917.] Zeitschr. f. indukt. Abstamm. u. Vererb. **19**: 115–123, Mar., 1918.

858. ALLEN, E. J., AND E. W. SEXTON. **The loss of the eye-pigment in Gammarus chevreuxi. A Mendelian study.** [Abstract from Jour. Marine Biol. Assoc. **11**: 273–353. *7 pl.* 1917.] Jour. Roy. Microsc. Soc. **1918**: 195, June, 1918.

859. ARNY, A. C., AND R. J. GARBER. **Variation and correlation in wheat, with special reference to weight of seed planted.** Jour. Agric. Res. **14**: 359–392, Aug., 1918.—Correlation studies were made on size of seed planted and plants produced in four crops of wheat. Review of literature is given. Various constants for large number of characters are determined and relation of environment to variation discussed. Means show that the various characters responded to growth conditions. Standard deviations for each character were in general largest where means were greatest, due to favorable conditions for development. Some exceptions to this rule were noted. With few exceptions coefficients of variability were higher in 1914 when means were lower.—Authors conclude that "correlation between weight of seed sown and resultant plant characters at maturity, is not high in any instance and may be so modified by environmental conditions that the relation may be slight or obliterated entirely."—Interrelation of plant characters is discussed. It was found that such correlations were modified by environment, depending on characters concerned.—*H. H. Love.*

860. BAUER, JULIUS. **Die konstitutionelle Disposition zu inneren Krankheiten. [The constitutional disposition to internal diseases.]** [Review by V. Haecker, from book. *586 p.* J. Springer, Berlin, 1917.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 98–109. Mar., 1918.

861. BELL, W. BLAIR. **The sex complex.** *8vo, xvii 233 p. 50 fig.* Ed. Baillière, Tindall & Cox, London, 1916.—Abstract by J. Arthur Thomson in Scientia **24**: 62–63. 1918.

862. BLAKESLEE, A. F., AND B. T. AVERY, JR. **A vegetative reversion in Portulaca.** Mem. Brooklyn Bot. Gard. **1**: 18. 1918.—Dwarf appeared among plants from commercial seed of *Portulacca grandiflora.* Dwarfs selfed produced only dwarfs, some of which carried reverting branches. These had red instead of green stems and had longer internodes. Flowers on both dwarf stock and reverting branches were red. Selfed seed from reverting branches produced both dwarf with short internodes and normal branches with long internodes, as well as occasional dwarfs that showed reverting branches.—*R. J. Garber.*

863. BLEULER, E. **Mendelismus bei Psychosen, speziell bei der Schizophrenie.** Verl. von O. Füssli. [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. 1^1. 1917.] Neurol. Centralbl. **1918**: 124. Feb., 1918.

864. BOAS, HELENE M. **The relationship between the number of sporophylls and the number of stamens and pistils—a criticism.** Bull. Torrey Bot. Club **45**: 343–345. Aug., 1918.—Criticism of recent paper by Harris, who found positive correlation between number of sporophylls in flowers of Ficaria, and deviation of pistils from number which would occur if ratio of pistils to stamens were constant. He interpreted his results as indicating biological relationship between increase in sporophyll number and tendency toward femaleness. Miss Boas points out that positive correlation is merely mathematical consequence of fact that pistils are as variable in number as stamens, but are less numerous.—*Sewall Wright.*

865. BROTHERTON, WILBER, JR., AND H. H. BARTLETT. **Cell measurement as an aid in the analysis of quantitative variation.** Amer. Jour. Bot. **5**: 192–206. Apr., 1918.—Variation in length of internodes is correlated with cell number or cell size or both. Influence of light on internode length in *Phaseolus multiflorus* is studied in relation to the length and number of epidermal cells. Growth in darkness results in elongation of internodes to 3.6 times length of normal internodes grown in light, 55 per cent. of increase being found to be due to increased cell division and 45 per cent. to greater extension of cells.—*J. P. Kelly.*

866. Caporn, A. St. Clair. **The inheritance of tight and loose paleae in Avena nuda crosses.** Jour. Genetics 7: 229–246. Aug., 1918.—Crosses between oats with tight paleae and *Avena nuda* with loose paleae were made. Three varieties with tight paleae were used, two white and one black-glumed. *Avena nuda* has several flowers in spikelet, other types usually two. Variety of *A. nuda* used showed mixture of gray and white glumes.

The F_1 plants produced heads having some many-flowered spikelets of *nuda* type, occurring nearer tip of head. Spikelets near base of heads were usually two-flowered. Paleae showed all gradations from pure tight to pure loose. Tight paleae occur in greater numbers near base of head, being correlated with few flowers in spikelets. Tight and loose paleae occur in varying relative numbers on F_1 heads.

F_2 and F_3 generations indicated 3 : 1 ratio with tight paleae recessive. From 119 sowings of F_2 plants 610 pure tights and 1835 not pure tights were obtained. Only 46 pure loose plants were obtained. Not pure tights were grouped into four classes: tight-containers, hard backs, penulti-looses, pure looses, depending on amount and nature of sclerotic tissue surrounding kernels. These various *nuda* types produce different results when tested, (A) throwing tight-containers, hardbacks, penulti-looses, and pure looses; (B) tight-containers, hardbacks, and penulti-looses; (C) tight-containers and hardbacks; (D) hardbacks, penulti-looses, and pure looses; (E) penulti-looses and pure looses. While it seems that tight paleae are represented by a single factor, author suggests following other factors which may operate to cause modifications of the not-tight forms; *X*, rendering all paleae pure tight; *Y*, rendering some only of paleae pure tight; *Z*, rendering some paleae more or less sclerotized but never wholly tight.

Number of flowers per spikelet on tight forms was not increased. Color and loose paleae are inherited independently.—*H. H. Love.*

867. Caporn, A. St. Clair. **An account of an experiment to determine the heredity of early and late ripening in an oat cross.** Jour. Genetics 7: 247–257. Aug., 1918.—Cross between early- and late-maturing oat was studied. Blooming periods of parent forms did not overlap. F_1 types generally intermediate. F_2 gave early, intermediate and late forms. Two of 106 plants were nearly as early as early parent, none so late as late parent. Intermediates ranged from early to late. Author concludes that earliness is possibly a function of three factors. A type which is comparatively early, in that its F_3 period never extends into the period of the late parent, is segregated on a 1 : 3 basis.—*H. H. Love.*

868. Capron, A. St. Clair. **On a case of permanent variation in the glume lengths of extracted parental types and the inheritance of purple colour in the cross Triticum Polonicum × T. Eloboni.** Jour. Genetics 7: 259–280. Aug., 1918.—*Triticum polonicum* having long glumes and colorless kernel, and *Triticum eloboni* having short glumes and purple kernel were crossed. Purple color is in pericarp. F_1 type has glumes intermediate in shape and size between those of parents, grains being purple. In F_2 183 plants were examined and gave some short-, some long-glumed, and a large number of intermediates. Curve of glume length falls into three periods. Similar result is obtained in F_3 from seed of 10 heterozygous F_2 plants. In F_3 170 F_2 plants segregated as follows: 41 short, 87 short, medium and long, and 42 long, indicating that long and short glume follows 1 : 2 : 1 ratio.

Kernel color in F_2 showed 28 flushed, 8 streaked and 136 non-colored, indicating 3 : 1 : 12 ratio. Color depends some on amount of light as to its development and is brought out by treatment with sulfuric acid. Of 123 non-colored F_2 plants 111 threw non-colored in F_3, and 12 threw non-coloreds and streakeds. Author believes two kinds of non-coloreds in F_2 were to each other as 15: 1. Results of F_3 were contradictory to F_2, for in F_2 12 non-colored : 1 streaked : 3 flushed were obtained, while in F_3 the results were 12 flushed : 1 non-colored : 3 streaked. Comparisons were made between these results and those obtained by East and Hayes (Inheritance in maize—Conn. Agric. Exp. Sta. Bull. 167, p. 57–104.) Author concludes that "segregations analogous to the F_2 segregation have not been found in the F_3 generation. Streaking, a character which suddenly appeared in the F_3 generation, has resemblances to particolouring in maize."—*H. H. Love.*

869. Caullery, M., and F. Mesnil. **Dimorphisme évolutif chez les Annélides polychètes.** Compt. Rend. Soc. Biol. 81: 707–709. July, 1918.—Dimorphism is found in developmental stages. Epitoke females of two sizes, with or without corresponding males, and atoke females with parthenogenetic eggs, exist in one species. Larvae may be pelagic for a time, or develop directly into adult. In Spio dimorphism is seasonal, in Polygordius geographic. Three species of Polygordius may be one species, since only larvae differ. One group is epigamic or epitoke in simple cases, or variously combines schizogamy, blastogenesis, sexual stolons, and viviparity.—*A. F. Shull.*

870. Cragg, E., and H. Drinkwater. **Hereditary absence of phalanges through five generations.** [Review by J. F. van Bemmelen, from Jour. Genetics 6. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 95–96. Mar., 1918.

871. Cuthbertson, W. **"Rogues" among potatoes.** Gard. Chron. 64: 102. Sept. 7, 1918.—Writer takes exception to statement by Mr. Jackson that "rogues" should be preserved owing to possibility of new sorts arising by vegetative variation. He states that he has found no important variants during twenty-five years. Color variations, however, have been found, e.g., King Edward gave tubers red in color, the color being maintained when propagated. Northern Star, which has touch of reddish-purple color in eye, gave tuber with eye-color distributed over whole tuber. Color of latter variety also remained constant when propagated. Indisputable evidence of mutation is requested.—*H. K. Hayes.*

872. Davenport, C. B. **Department of experimental evolution.** Carnegie Inst. Washington Year Book 16 (1917): 111–132. 1918.—A summary is given of progress by the Station at Cold Spring Harbor during 1917. Metz's studies on chromosome complex of *Drosophila ampelophila* and related species reveals series of twelve types; breeding of *D. virilis* for comparison with *D. ampelophila* has shown degree of mutability in *D. virilis* equal to that in *D. ampelophila*, with mutants of same general types; linkage and crossing over occur as in *D. ampelophila*; five linkage groups already known in *D. virilis* and discovery of sixth is anticipated since this species has six chromosome pairs; two mutants proved as incompatible in reproduction as species in nature. MacDowell found developing male rats subjected to daily doses of alcohol vapor 20 per cent. lighter than normal brothers at end of half a year; imbibition of alcohol reduced fecundity to one-third. MacDowell has published on selection for bristle number in Drosophila and Riddle on significance and control of sex in pigeons. Two rare defects of pigeons, ataxia and scraggly plumage, were perpetuated by Riddle to fourth generation; formation of melanin was induced in choroid of albino dove, free oxygen being found necessary. Banta discovered environmental factors induce occurrence of sexual individuals in Cladocera; one strain of Daphnia gave origin to a second case of sex-intergrading; most female intergrades with chiefly male secondary characters proved sterile. Blakeslee reported on two yellow-coned variants in *Rudbeckia hirta*, one turning black, other crimson with KOH, which gave purple F_1, with appearance again in F_2 of the two yellows. In *Datura stramonium* he found new mutants; the "Globe" mutant has not been found pure-breeding; previously described form with slit corollas and leaves impressed its characteristics on cions of normal type and abnormality is suspected as bacterial; one mutant found incapable of crossing with original type. In Portulaca, Blakeslee reported vegetative segregations and Mendelian nature of doubling, the heterozygous semi-doubles giving full doubles (homozygous), semi-doubles and singles. Harris has secured seven lines of beans yielding only abnormal offspring. He has investigated relation between ovules per pod and fertility, and between number of pods per plant and individual seed-weight in beans. Blakeslee and Harris found a marked inverse correlation between egg-laying ability and yellow ear-lobes in White Leghorns. Davenport's studies on traits of naval men resulted in formation of new criteria for selection of officers; it is asserted that strong inclination toward sea is dependent on recessive factor.—*J. P. Kelly.*

873. Davenport, C. B. **The feebly inhibited.** *8vo, 158 p. 86 fig.* Carnegie Inst., Washington, Washington, D. C., 1915.—Abstract by Y. Le Lay in Scientia 24: 64. 1918.

874. DAWSON, E. RUMLEY. **The causation of sex in man.** *2nd ed. 8vo, xiv 226 p. 21 fig.* Lewis & Co.: London, 1917.—Abstract by J. Arthur Thompson in Scientia 24: 61–62. 1918.

875. DRINKWATER, H. **A second brachydactylous family.** [Review by H. W. Siemens, from Jour. Genetics 4: 323. *pl. XI–XV, fig. 3.* 1914–1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 96. Mar., 1918.

876. EAST, E. M. **Intercrosses between self-sterile plants.** Mem. Brooklyn Bot. Gard. 1: 141–153. July, 1918.—Data are reported concerning the cross-sterility and cross-fertility of 53 F_1 hybrids from *Nicotiana Forgetiana* and *Nicotiana alata*, two species in which self-incompatibility in fertilization appears to be strongly developed. In all, 103 reciprocal matings were made from which it was found that the population fell into classes. Each member of a class was cross-sterile with every other member, but was cross-fertile with every member of other classes. Three classes were well defined with 22, 16 and 12 individuals, respectively; two classes contained but one individual each; presence of a fifth class was suggested by behavior of a single plant.

These results are explained in terms of Mendelian factors assumed to be directly concerned with compatibility. Author adheres to doctrine, often announced previously, that incompatibility in such cases is due to "similarity" of constitution and that compatibility is due to "dissimilarity" of constitution. It is recognized however, as has frequently been pointed out for similar cases, that pollen grains of a plant appear to act quite alike independently of any segregation of hereditary factors in reduction divisions concerned with their formation. It is stated that reciprocal crosses always gave same results and that self-fertilization in these plants increases cross-incompatibility among plants of subsequent generations.

It is reported that self-sterility (and cross-sterility as well) of a plant may decline toward end of flowering period, to such degree that plant may become self-fertile, a condition which is called "end-season pseudo-fertility."

All data presented in this paper are given in same detail, together with other data and with more extended discussion, in another paper which precedes as to date of publication (Genetics 2: 505–609. Nov., 1917).—*A. B. Stout.*

877. EMERSON, R. A. **A fifth pair of factors, Aa, for aleurone color in maize, and its relation to the Cc and Rr pairs.** Mem. Cornell Univ. Agric. Exp. Sta. 16. *23 × 16 cm., 231–289 p.* Cornell Univ., Ithaca, N. Y., Nov., 1918.—A pair of factors, *Aa*, such that aleurone color develops only in the presence of *A* in addition to *C*, *R* and *ii*, is announced to account for 27:37 F_2 ratios of colored to colorless aleurone. Hypothesis regarded as substantiated by following tests: (1) Colored F_2's shown to be of four classes resulting in F_3 ratios of 1:0, 3:1, 9:7 and 27:37 in approximately the relation of 1:6:12:8, respectively, and (2) colorless F_2's bred true in F_3 and shown to consist of the seven classes, *aCR*, *AcR*, *ACr Acr*, *aCr*, *acR* and *acr*. Use of *aCR*, *AcR*, and *ACr* in testing for aleurone-color factors is explained and illustrated. Effect on aleurone color of degree of maturity and of color, composition and texture of underlying endosperm is discussed and influence of previously unannounced genetic factors noted. Heterozygous mottlings of aleurone is due to *Rr* pair and seen only when *R* is contributed by male and *r* by female, resulting aleurone *rrR*, self color appearing in reciprocal cross, aleurone *RRr*. Various hypotheses are noted as possible interpretations. Anomalously colored seeds, part colored and part colorless, are rarely if ever due to *Rr* pair, but frequently to *Cc* or *Aa* pairs and then only when dominant factor is contributed by male and recessive by female. Hypotheses involving vegetative segregation, somatic mutation and aberrant chromosome behavior discussed as possible interpretations.—*R. A. Emerson.*

878. FISCHER, E. **Zur Frage der Vererbung der Empfänglichkeit von Pflanzen für parasitische Pilze. [On the question of inheritance of the susceptibility of plants to parasitic fungi.]** [Review by E. Schiemann, from Mitt. Nat. Ges. Bern für 1916, Mykol. Beitr. 8: 144–156. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 136–138. Mar., 1918.

879. FLEISCHER, BRUNO. **Über myotonische Dystrophie.** [Abstract by Kurt Mendel, rom Münchener med. Wochenschr. 1917.] Neurol. Centralbl. 1918: 126, Feb., 1918.

880. GÖBELL, RUDOLF, AND WERNER RUNGI. **Eine familiäre Trophoneurose der unteren xtremitäten.** [Abstract by Kurt Mendel, from Archiv f. Psych. 57²: 1917.] Neurol. entralbl.] 1918: 121. Feb., 1918.

881. GOODALE, H. D. **Internal factors influencing egg production in the Rhode Island ted breed of domestic fowl.** Amer. Nat. 52: 65–94, 209–232, 301–321. *17 fig.* Feb.–Mar., pr.–May, June–July, 1918.—Starting with the assumption that the egg-record of a hen expressed as a given number of eggs per unit of time, and taken by itself, is not a sufficient neasure or description of egg production, even under favorable environment," author proeeds to inquire regarding influence or interaction of number of external and of innate factors, uch as rate of growth, bodily maturity, stamina, cessation of growth, sexual maturity, age t first egg, cycles, molt, rate and rhythm of production, and Pearl's genetic factors L_1 and $_2$. In turn each of these factors is analyzed and discussed. Conclusions, based upon four ears' study of production in Rhode Island Red breed, may be summarized as follows: (*1*) Date of first egg depends on time of hatching and rate of growth. On average, hens laying arly in fall lay more winter eggs than those that begin later. (*2*) On average, pullets that ay early in life (6 to 7 months) lay more eggs than those that lay at 8 or 9 months. Variaility in age at first egg was greater for Goodale's than for Pearl's stock. (*3*) Birds that lay apidly lay more eggs than birds that lay slowly; and birds that lay late in fall lay more han those that stop early. (*4*) Some pullets lay continuously for long periods while others ay rapidly, but in cycles with period of rest between. In Goodale's Reds a "winter cycle," omparable to that found by Pearl in Barred Rocks, was absent "in a large percentage" of ens. Curves of winter production are shown to be compound curves. (*5*) Small birds nature earlier than large ones and therefore usually lay more winter eggs. Birds of poor tamina however, though sometimes making good records, usually manifest delay in appearnce of first egg and hence give lower winter records. (*6*) Author regards fecundity as unatisfactory character upon which to study effects of selection because character is complex nd not simple unit character. Genetic constitution of Goodale's stock, with reference to earl's fecundity factors (L_1 and L_2 was not made out with certainty, but author believes hat his Reds fall into Pearl's class of high producers. (*7*) Concludes by saying that knowldge of factors determining production is of importance from both commercial and biological tandpoint. Biologically problem must be attacked from viewpoint that fecundity in fowls not simple character but extremely complex.—*P. B. Hadley.*

882. GREGORY, R. P. **On variegation in Primula sinensis.** [Abstract by E. Lehmann, om Jour. Genetics 4: 305–322. 1915.] Zeitschr. Bot. 10: 133–137. 1918.

883. HAECKER, VALENTIN. **Über Gedächtnis, Vererbung und Pluripotenz.** [On memry, heredity and pluripotence.] [Review by Georg Sommer. In Zeitschr. indukt. Abamm. u. Vererb. 19: 91–94. Mar., 1918.] *97 p. 14 fig.* G. Fischer: Jena. 1914.

884. HARRIS, J. ARTHUR. **Further studies on the inter-relationship of morphological and hysiological characters in seedlings of Phaseolus.** Mem. Brooklyn Bot. Gard. 1: 167–174. uly 6, 1918.—Seedlings of navy bean, morphologically aberrant in having cotyledons vertially separated, are compared with normal seedlings in respect to (*a*) mean green weight,) mean dry weight and (*c*) percentage of dry matter present in primordial and first comound leaves. Normal and abnormal seedlings were grown in pairs under rigid control and amples of leaves were taken from plants in lots of 100. Data are given for 23 (4,600 plants) ach samples. Values show clearly that "abnormal plants produce relatively as well as bsolutely less dry matter than normals." Morphological variation is associated with hysiological differentiation.—*A. B. Stout.*

885. HARRIS, J. A. **Further studies on the relationship between bilateral asymmetry and rtility and fecundity in the unilocular fruit.** [Abstract by Cyril West, from Genetics 2:

186–204. 1917.] Physiol. Abst. 3: 355. Sept., 1918. See also Exp. Sta. Rec. 38: 29. Jan., 1918.

886. Harris, J. A. **Supplementary determinations of the relationship between the number of ovules per pod and fertility in Phaseolus.** [Abstract by Cyril West, from Genetics 2: 282–290. 1917.] Physiol. Abst. 3: 355. Sept., 1918. See also Exp. Sta. Rec. 38: 29. Jan., 1918.

887. Harris, J. A. **On the applicability of Pearson's biserial r to the problem of asymmetry and fertility in the unilocular fruit.** [Abstract by Cyril West, from Genetics 2: 205–212. 1917.] Physiol. Abst. 3: 355. Sept., 1918. See also Exp. Sta. Rec. 38: 29. Jan.. 1918.

888. Harrison, J. W. H. **Studies in the hybrid Bistoninae.** [Abstract by J. F. van Bemmelen, from Jour. Genetics 6: 95–161. *4 pl.* 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 124–125. Mar., 1918.

889. Hayes, H. K. **Natural cross-pollination in wheat.** Jour. Amer. Soc. Agron. 10: 120–122. 1918.—Three out of fifty pedigree cultures of wheat supposed to be pure lines, but which had been exposed to natural crossing, showed hybridity by Mendelian segregation. Further observation revealed other evident cases, all of which leads to conclusion that either conditions were unusually favorable for natural crossing or else this occurs much more frequently than has been generally supposed to be the case.—*L. H. Smith.*

890. Hayes, H. K. **Normal self-fertilization in corn.** Jour. Amer. Soc. Agron. 10: 123–126. 1918.—Describes experiment in which yield of corn was reduced more than 50 per cent. first year following self-fertilization. Experiment to determine amount of self-fertilization occurring under normal field conditions, by interplanting varieties of different-colored kernels, indicated less than 5 per cent. self-pollination.—*L. H. Smith.*

891. Hayward, P. S. **A new hybrid lily.** Gard. Chron. 64: 107–108, 148. 1918.—A new hybrid between the *auratum* and *speciosum* groups of lilies, superseding *L. Parkmannii* in point of interest on account of the rareness of this cross. New hybrid differs from *L. Parkmannii* in "form, petal and colouring."—*M. J. Dorsey.*

892. Heilig, M. **Über Beziehungen zwischen klinischem und histopathologischem Befund bei einer familiären Erkrankung des kindlichen motorischen Systems.** [Abstract by Kurt Mendel, from Arch. f. Psych. 57². 1917.] Neurol. Centralbl. 1918: 119. Feb., 1918.

893. Henkemeyer, A. **Untersuchungen über die Spaltungen von Weizenbastarden in der F_2 und F_3 Generation.** [Investigations on the splitting of wheat hybrids in F_2 and F_3 generations.] [Review by G. v. Ubisch, from Diss. Göttingen. *8vo, 32 p.* 1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 139–140. Mar., 1918.

894. Heribert-Nilsson, N. **Eine Mendelsche Erklärung der Verlustmutanten.** [**A Mendelian explanation of loss mutations.**] [Review by E. Baur, from Ber. Deutsch. Bot. Ges. 34: 870. 1917.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 90–91. Mar., 1918.

895. Heymann, Adolf. **Zur Lehre von der partiellen Myotonia congenita.** [Abstract by Kurt Boas, from Inaug.-Dissert. Kiel, 1917.] Neurol. Centralbl. 1918: 125. Feb., 1918.

896. Higier, H. **Eine seltene Form von Epilepsie bei drei Brüdern (Epilepsie myoclonica Unterricht-Lundborg–J.** 'Author's abstract from Ber. d. Warschauer ärztl. Ges. 112. 1916.] Neurol. Centralbl. 1918: 120. Feb., 1918.

897. Hübner, A. H. **Über Myotonie.** [Abstract by Kurt Mendel, from Deutsche Zeitschr. f. Nervenheilk. 57^{2-4}. 1917.] Neurol. Centralbl. 1918: 125. Feb., 1918.

898. HUMBERT, E. P. **A striking variation in Silene noctiflora.** Bull. Torrey Bot. Club 45: 157–158. Apr., 1918.—Describes seedlings with 3 cotyledons and with divided cotyledons.—*J. A. Harris.*

899. IKENO, S. **Studies on the hybrids of Capsicum annuum. Part II. On some variegated races.** [Abstract by E. Lehmann, from Jour. Genetics 6: 201–230. 1916.] Zeitschr. Bot. 10: 133–137. 1918. See also Exp. Sta. Rec. 39: 123. Aug., 1918.

900. IKENO, S. **A note to my paper on some variegated races of Capsicum annuum.** [Abstract by E. Lehmann, from Jour. Genetics 6: 315–316. 1916.] Zeitschr. Bot. 10: 133–137. 1918.

901. ISHIKAWA, MITSUHARA. **A list of the number of chromosomes.** [Review by G. Tischler, from Tokyo Bot. Mag. 30: 404–448. *32 fig.* 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 125–126. Mar., 1918.

902. JEFFREY, E. C. **Hybridism and the rate of evolution in angiosperms.** [Review by E. Baur, from Amer. Nat. 50: 129–143. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 134. Mar., 1918.

903. JONES, L. R. **Disease resistance in cabbage.** Proc. Nation. Acad. Sci. 4: 42–46. 1918.—Most destructive disease of cabbage is "yellows," caused by soil-inhabiting fungus (*Fusarium conglutinosus*) which invades root system. It may persist indefinitely in soil which is called "'cabbage sick."—Investigation of disease and its control was begun in Wisconsin in 1910. In most diseased fields some normally developed plants were found. Some were of best commercial type and fifty resistant plants were selected. Seed was grown and in 1912 each head strain was planted separately on "sick" soil. Commercial strains were planted as controls.—Poorest of selected strains proved decidedly superior to best of controls. Seed was grown from best of selected strains and planted in 1914. Best selected strain yielded 18.8 tons per acre against 2.1 tons for average of controls.—This strain has been distributed under name "Wisconsin Hollander."—The behavior of the organism causing disease was worked out by W. H. Tisdale by using flax wilt as basis, since cabbage is slow-growing plant to work with. Secondary studies with cabbage, while not complete, indicate general likeness in behavior.—In susceptible plant the organism penetrates directly to vessels and then ramifies through them. In resistant plants invasion is much slower and before it reaches vessels corky layer is formed which permanently walls off organism.—Crossing highly susceptible with resistant strains show resistance has tendency to be dominant. Indications are that it is dependent on several heritable factors.

J. C. Gilman found "critical soil temperature" for invasion of plant to be 17°C. Below this plants are not attacked even in sickest soils while for some 10°C. above this, attack becomes progressively more virulent.—In field trials strains resistant in Wisconsin have proved similarly resistant from New Jersey to Iowa. Investigations with other varieties at Wisconsin and also in Ohio, Iowa and Maryland have given encouraging results and indicate resistant strains can be secured from any vigorous variety. [See Bot. Absts. 1, Entry 321. Also see Physiol. Absts., 3: 305. July–Aug., 1918.]—*Karl Kurtzweil.*

904. KEARNEY, THOMAS H., AND WALTON G. WELLS. **A study of hybrids in Egyptian cotton.** Amer. Nat. 52: 491–506. *3 fig.* Oct.–Nov., 1918.—Preliminary study of crosses between varieties belonging to same general type of Gossypium. Less variable Puna and more variable Gila (differ chiefly in size and shape characters) gave practically no dominant in F_1 and unimodal distributions in F_2. Back-crossing F_1 twice with either parent obliterated expression of character of other parent.—Characters not correlated physically or physiologically are transmitted independently. F_2 and F_3 were not more variable than Gila and but slightly more variable than Puna.—*R. J. Garber.*

905. KIESSLING, L. **Untersuchungen über die Vererbung von Stickstoffgehalt und Korngrosse der Zweizeiligen nickenden Gerste.** **[Investigations on the inheritance of nitrogen con-**

tent and size of grain in two-rowed nodding barley.] [Review by E. Schiemann, from Zeitschr. Pflanzenzüchtung 3: 81–147. Sept., 1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 141. Mar., 1918.

906. Kiessling, L. **Über die Streifenkrankheit der Gerste als Sorten und Linienkrankheit. [On the striping-disease of barley as a varietal and racial disease.]** [Review by E. Schiemann from Fühlings Landw. Ztg. 65: 537–549. Sept., 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 141–142. Mar., 1918.

907. King, Helen Dean. **Studies on inbreeding. III. The effects of inbreeding with selection, on the sex ratio of the albino rat.** Jour. Exp. Zool. 27: 1–35. *1 fig.* Oct., 1918.—Selection of breeding females from litters containing excess of males increased sex ratio (number of males per 100 females) from norm of 105 to 122.3 when females were mated to litter brothers, and to 115.6 when females were mated to unrelated males. Selection of breeding females from litters containing excess of females reduced sex ratio to 81.8 when females were mated to litter brothers, and to 91.1 when females were mated to stock males. Effect of selection reaches its maximum in first generation, and was not cumulative. Mating stock females to males from series selected for high and low sex ratio resulted in both cases in a reduced sex ratio, but the reduction was greater when males came from series selected for low sex ratio. In either case reduction was small, to 102.3 and 96.2 respectively, and may not be significant. Alteration of sex ratio is thus most easily affected by selection of females. Inbreeding did not of itself change the sex ratio to any extent. Author believes selection affects egg metabolism in such way as to render eggs more easily fertilized by male- or female-producing spermatozoa.—*A. F. Shull.*

908. Koch, Carl. **Ein Fall einer Kombination von progressiver Muskelatrophie mit Myotonie.** [Abstract by Kurt Mendel, from Ber. aus d. Abt. f. Kriegsneur. d. k. k. Reservespitales Nr. 3 in Laibach. Sept., 1917.] Neurol. Centralbl. 1918: 126. Feb., 1918.

909. Kooy, F. H. **Uber einen Fall von Heredodegeneratio, Typus Strümpell, bei Zwillingen.** [Abstract by Kurt Mendel, from Deutsche Zeitschr. Nervenheilk. 57^{3-6}. 1917.] Neurol. Centralbl. 1918: 122. Feb., 1918.

910. Kretschmer, Ernst. **Über eine familiare Blutdrüsenerkrankung.** (Abstract by Kurt Mendel, from Zeitschr. Ges. Neurol. u. Psych. 36^{1-2}. 1917.] Neurol. Centralbl. 1918: 118. Feb., 1918.

911. La Marca, F. **Un nouvel hybride de greffe. [A new graft-hybrid.]** Compt. rend. Paris, 166: 647–649. 1918.—Describes graft hybrids appearing on 40-year old olive trees located in Caserta province, Italy. Graft belonged to variety Cannellina which produces ivory-white fruit at maturity while stock belonged to the variety Caiazzana which produces black fruit. Three of grafted trees bore both ivory-colored and black fruit. On one tree black fruit appeared at summit and at periphery, on second tree at end of sprout which grew perpendicularly from extremity of old branch, while third was from one of three boughs growing from same point.

Great diversity of coloration convinced observer that asexual hybridization was cause, and suspected hybrid was compared with varieties of Cannellina and Caiazzana. Comparison of stones, relation of equatorial and longitudinal breadth of same, leaf shape, peduncle of drupes, as well as analyses of oil showed hybrid to be different from parental varieties used for stock and graft. For many of these characters the suspected graft hybrid was intermediate.—Same phenomenon verified for four successive seasons convinced author that "asexual hybridization" actually was the cause. [See Physiol. Absts. 3: 293. July-Aug., 1918. Also, Jour. Roy. Microsc. Soc. 1918: 318. Sept. 1818. Also, Exp. Sta. Rec. 39: 447. Oct., 1918.]—*H. K. Hayes.*

912. Loeb, J. **Further experiments on the sex of parthenogenetic frogs.** Proc. Nation. Acad. Sci. 4: 60–62. 1918.—Twenty normal frogs of full size have been raised from artificially

parthenogenetic eggs, development being induced by method of puncture. Nine are still alive. Sex of nine others has been ascertained at age of 10 to 18 months, seven being males, two females. One male was examined cytologically, found to have diploid number of chromosomes. Possibilities for chromosome number in female are discussed. [Abstract by W. D. Halliburton in Physiol. Abst. 3: 328. Sept., 1918. See also Jour. Roy. Microsc. Soc. 1918: 290. Sept., 1918.]—*A. F. Shull.*

913. Longman, H. A. and C. T. White. **Mutation in a proteaceous tree.** Proc. Roy. Soc. Queensland 30: 162–165. *Fig. 22.* Oct. 11, 1918.—In *Buckinghamia celsissima* normal flower has at base of pistil a crenulate gland. Several hundred flowers from specimen in Brisbane Botanical Garden showed this gland cut into 4 or 5 segments in nearly all, with 2 of these segments elongated into noticeable style-like processes that had no enlargement basally. Investigation revealed that seed parent of this specimen had same pair of processes in its flowers. Other trees were found that showed small percentage of such exceptional flowers.—*James P. Kelly.*

914. Love, H. H., and W. T. Craig. **The relation between color and other characters in certain Avena crosses.** Amer. Nat. 52: 369–383. Aug.-Sept., 1918.—Results of several years' study of cross *Avena fatua* × *Avena sativa* var. Sixty Day, which closely resemble forms used by Surface. *Avena fatua* is brown or black, with both grains of spikelets awned and pubescent and has typical wild type of base, surrounded by tuft of basal hairs. Sixty Day is yellow, seldom awned and has no dorsal hairs, but may have an occasional basal hair. Parent and F_1 plants were grown in greenhouse, later generations in field. F_1 was generally intermediate-color, lighter brown than wild type, large grain of spikelet often awned and covered with dorsal hairs, small grain of spikelet never awned but with occasional dorsal hairs, base more like *sativa*, yet intermediate with some basal hairs at either side but not at back. F_2 gave several types, some resembling P_1, also other types different in color, amount of awning, pubescence, and the like. Color types were black, gray and yellow. The black oats were all more or less pubescent and the grays either pubescent or smooth. Both blacks and grays were awned, partially awned, or awnless. But the yellow oats were all smooth and entirely or nearly awnless, none possessing strong awns of wild type and none having more than 30 per cent. of awns, whereas blacks and grays were distributed throughout entire range from awnless to fully awned. This indicates some relation between yellow color and lack of awns.—Similar but less definite evidence of apparent inhibition of awning produced by yellow color was discussed by Nilsson-Ehle.—Assuming that *fatua* carries genes for black gray and yellow, segregation of 12 black: 3 gray: 1 yellow would be expected. Proportion of blacks to non-blacks was fairly close to 3: 1, but difficulty of distinguishing pale grays from yellows caused considerable deviation in gray and yellow classes. It is very significant that there are no smooth blacks. The grays segregated as to pubescence on what may be a 1: 2: 1 ratio. No pubescent yellows have been obtained. Apparently there are two factors for pubescence, one linked with black, the other independent of any color factor.—In type of base the sucker-mouth shape of *sativa* is dominant or partially so to wild type, giving in this and other crosses 3: 1 ratio, except in yellow oats which are all of *sativa* class. Thus some factor or factors related to yellow color inhibit production of wild type of base.—Data from three F_3 families exhibiting segregation similar to that obtained in F_2 substantiate inferences drawn from F_2 data, segregation as to color being clearly 12 black: 3 gray: 1 yellow. Segregation as regards pubescence and type of base agrees closely with that of F_2.—Three other F_3 families came from F_2 plants which were black, pubescent on one grain, and nearly awnless. Combined data gave classes, 231 black with one grain pubescent: 88 yellow smooth. This further substantiates statement that a pubescence factor is linked with black color factor.—In general there is very definite relation between color of glumes and production of awns. Form of *fatua* used here had two factors for pubescence, while in cross between *Avena fatua* and *Avena sativa* var. Tartar King, there were two types of *fatua* involved, one giving 15: 1 ratio, other, 3: 1 ratio. Latter type of *fatua* crossed with Sixty Day produced only smooth non-blacks, showing that this form has pubescence factor closely linked with black color gene.—Assuming *Avena fatua*

to be represented by *BBGGYYPP*, where *B* is factor for black; *G*, for gray; *Y*, for yellow; *P*, for pubescence; formula for Sixty Day becomes *bbggYYpp*; and *Y* inhibits pubescence in absence of *B* or *G*. This is the most reasonable explanation in view of data from other crosses. Facts in F_2 and F_3 tend to substantiate this hypothesis. In addition there is good evidence for existence of distinct strains within same variety of oats. Inhibiting effect of yellow on awns, pubescence and base, is not general for yellow oats.—*E. B. Babcock.*

915. McQueen, E. N. **The distribution of attention.** *8vo, 142 p.* University Press, Cambridge, England, 1917. [Abstract by Y. Le Lay.] Scientia 24: 64–65. 1918.

916. Meade, Rowland M. **Bee keeping may increase the cotton crop.** Jour. Heredity 9: 282–285. *fig. 16–17.* Oct., 1918.—Percentage of cotton flowers developing mature bolls is generally low. This is found to be case even in California, where boll weevil is absent and water is furnished by irrigation. There is good reason for supposing that lack of fertilization is important factor in this connection. Certain forms in which pistils are short, usually become self-pollinated; but flowers with long pistils are dependent on insects, at least to great extent. Experiments were made at San Antonio, Texas, in which plants were artificially pollinated. Percentage of bolls produced was materially increased. It is therefore suggested that bee-keeping in vicinity of cotton-fields, especially when cotton is of long-stapled type with long-exserted pistils, may be distinctly advantageous. Pollen of cotton is of such nature that it is not carried by wind.—*T. D. A. Cockerell.*

917. Miles, Frank C. **A genetic and cytological study of certain types of albinism in maize.** [Review by Tine Tammes, from Jour. Genetics 4: 193. 1914–1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 142–143. Mar., 1918.

918. Miles, Frank C. **A genetic and cytological study of certain types of albinism in maize.** [Abstract by E. Lehmann, from Jour. Genetics 4: 193–214. 1915.] Zeitschr. Bot. 10: 133–137. 1918.

919. Naegeli. **Über Myotonia atrophica.** [Abstract by Kurt Mendel, from Münchener med. Wochenschr. 1917[51].] Neurol. Centralbl. 1918: 126. Feb., 1918.

920. Naville, F. **L'idiotie amaurotique familiale de Tay-Sachs.** [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. 1[1]. 1917.] Neurol. Centralbl. 1918: 122. Feb., 1918.

921. Naville, F. **Étude anatomique du névraxe dans un cas d'idiotie familiale amaurotique de Sachs.** [Abstract by Kurt Mendel, from Schweizer Arch. f. Neurol. u. Psych. 1[1]. 1917.] Neurol. Centralbl. 1918: 123. Feb., 1918.

922. Nilsson-Ehle, H. **Gibt es erbliche Weizenrassen mit mehr oder weniger vollständiger Selbstbefruchtung? [Are there hereditary races of wheat with more or less complete self-fertilization?]** [Review by E. Schiemann, from Zeitschr. f. Pflanzenzüchtung 3: 1–6. Sept., 1918.] Zeitschr. f. indukt. Abstamm. u. Vererb, 19: 140–141. Mar., 1918.

923. Ortlepp, Karl. **Monographie der Füllungserscheinungen bei Tulpenblüten. [Monograph of the phenomena of doubling in tulip blossoms.]** [Review by E. Lehmann, of book. Leipzig, 1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 143–144. Mar., 1918.

924. Peltier, Geo. L. **Susceptibility and resistance to citrus-canker of the wild relatives, citrus fruits and hybrids of the genus Citrus.** Jour. Agric. Res. 14: 337–358. Aug., 1918.—Author attempts to determine susceptibility and resistance to citrus-canker (caused by *Pseudomonas citri* Hasse) of wild relative of citrus and certain more obscure species, varieties and hybrids. Methods of inoculation on young vigorous plants were carefully controlled and all forms subsequent to inoculation were grown at relatively high temperatures in cases in the greenhouse where practically 100 per cent. humidity was maintained. Relative sus-

ceptibility of different forms under experiment was judged according to number, size, and character of leaf spots. Material was made available by the United States Department of Agriculture.

The inoculation tests show that the "Citrus-canker" is apparently limited to those plants having edible fruits with stalked pulp vesicles of the subtribe Citrinae which includes the genera, Poncirus, Fortunella, Eremocitrus, Citrus, and Mirocitrus. Of citrus relatives, Fortunella, Eremocitrus, and Mirocitrus show some resistance to this canker while Poncirus is extremely susceptible. All species and varieties of citrus tested are susceptible, although some forms as the varieties of *C. nobilis*, the Kansas orange and "possibly" *C. milis* showed some resistance.

From genetic standpoint, relative susceptibility of certain hybrids is important. When both parents are susceptible the hybrid shows some susceptibility. When one parent is resistant hybrid "retains to a large extent" resistance of resistant parent. Hybrids between two resistant parents were not available for test.—*M. J. Dorsey.*

925. PUNNETT, R. C. **Studies in cereal-breeding.** Gard. Chron. **64**: 180. Oct. 12, 1918.—Abstract of three papers on oat and wheat crosses by A. St. C. Caporn., in Journal of Genetics, August, 1918. [See Bot. Absts. 1, Entries 866, 867, 868.]

926. PUNNETT, R. C. **Reduplication series in sweet peas.** [Review by Tine Tammes, from Jour. Genetics **3**: 77. 1913–1914.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 143. Mar., 1918.

927. RABAUD, ETIENNE. **"Dislocated" mice.** [Abstract from Bull. Soc. Zool. France, **42**: 87–97. *1 fig.* 1917.] Jour. Roy. Microsc. Soc. **1918**: 33. Mar., 1918.

928. ROBERTS, ELMER. **Fluctuations in a recessive Mendelian character and selection.** Jour. Exp. Zoöl. **27**: 157–192. *2 pl., 3 fig.* Nov. 20, 1918.—Thirty-four generations of selection for length of wing effected no recognizable change in a strain of Drosophila with vestigial wings. After crossing with normal wild stock, significant increase in size of wings was found among vestigial segregates. Increase was greater in males than in females. Thirty-two generations of selection produced no further change. Much of variation was found to be due to temperature, males being more easily affected than females.—*Sewall Wright.*

929. ROSENBERG, O. **Die Reduktionsteilung und ihre Degeneration in Hieracium. [Reduction division and its degeneration in Hieracium.]** [Review by G. Tischler, from Svensk. bot. Tidskr. **11**: 145–206. *26 fig.* 1917.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 130–132. Mar., 1918.

930. SAHLI, G. **Die Empfänglichkeit von Pomaceenbastarden, Chimären und intermediären Formen für Gymnosporangien. [Susceptibility of Pomaceous hybrids, chimaeras, and intermediate forms to Gymnosporangia.]** [Review by E. Schiemann, from Centralbl. Bakt. II, **45**: 264–301. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 136–138. Mar., 1918.

931. SCHAXEL, J. **Über den Mechanismus der Vererbung. [On the mechanism of heredity.]** Review by M. Gerschler, of book. Fischer, Jena. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 89–90. Mar., 1918.

932. SHULL, A. FRANKLIN. **Relative effectiveness of food, oxygen, and other substances in causing or preventing male-production in Hydatina.** Jour. Exp. Zoöl. **26**: 521–544. Aug., 1918.—Experiments with rotifers to test effect of saturation of culture water with air-oxygen mixtures, of which 40 or 60 per cent. was oxygen, upon ratio of male-producing females to female-producing females. (*1*) Six lots of rotifers subjected to 60 per cent. oxygen mixture were exposed to ordinary air conditions as control. Control showed total average of about 14 per cent. male-producing females while those treated with oxygen yielded an average of about 26 per cent, male-producing females. (*2*) 14 lots in air mixture yielded about 19 per

cent. male-producing females while in 60 per cent. oxygen mixture 11 lots yielded about 21 per cent. male-producing females and 3 lots yielded 54 per cent., thus averaging about 27 per cent. male-producing females. (*5*) 14 lots under air conditions yielded about 13 per cent. male-producing females, while 11 lots in 40 per cent. oxygen mixture yielded only about 6 per cent. but 3 lots yielded about 69 per cent. male-producing females, thus making total average of about 21 per cent. male-producing females, or about 8 per cent. higher than control. Higher total average of male-producing females in oxygenated lots seems to indicate that oxygen is potent factor in production of male-producing females. (*5*) Many tests to determine amount of oxygen in culture waters that were subjected to air, 40 per cent. and 60 per cent. of oxygen atmosphere, at beginning and at end of experiments, showed that those subjected to oxygen atmosphere always contained more oxygen than similar ones not subjected to oxygen. Manure scum decreased amount of oxygen in various culture waters while Euglena increased it. (*6*) Certain lots of rotifers were fed Euglena in non-oxygenated water, certain lots manure scum in oxygenated water, and other lots manure scum in non-oxygenated water, in order to determine influence of these agents in causing production of male-producing females. 20 lots fed Euglena yielded about 14 per cent. male-producing females. 20 lots fed manure scum yielded about 5 per cent. male-producing females. 18 lots fed manure scum in oxygenated water yielded only about 4 per cent.; while 2 other similarly treated lots yielded about 32 per cent. male-producing females, thus making total average of about 8 per cent.; which is about 3 per cent. of male-producing females higher than in preceding lots that received no oxygen treatment. Author concludes that Euglena increases male-producing female production about 9 per cent. above that of manure scum and that oxygen in manure scum increases male-producing female production about 3 per cent. above that in manure scum without oxygen treatment. Furthermore general conclusion is reached from this experiment that food is about twice as effective as oxygen in causing male-producing females to be produced. (*7*) Euglena in spring water yielded maximum percentage of male-producing females, while manure scum in manure solution yielded minimum percentage of male-producing females. (*8*) In two experiments with creatin, Euglena, manure scum, and spring water one experiment showed that effect of Euglena as food was nearly 17 times as effective as oxygen and other experiment only about 3 times as effective as oxygen, in increasing male-producing females. General conclusion of whole paper is that oxygen and food are factors which increase number of male-producing females but that food is several times as effective as oxygen in causing this increase.—*D. D. Whitney.*

933. Shull, A. Franklin, and Sonia Ladoff. **Factors affecting male-production in Hydatina.** [Abstract by M. Gerschler, from Jour. Exp. Zoöl. 21. 1916.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 110–115. Mar., 1918.

934. Shull, A. Franklin. **Periodicity in the production of males in Hydatina senta.** [Abstract by M. Gerschler, from Biol. Bull. 28. 1915.] Zeitschr. indukt. Abstamm. u. Vererb. 19: 110. Mar., 1918.

935. Shull, George Harrison. **The duplication of a leaf-lobe factor in the shepherd's-purse.** Mem. Brooklyn Bot. Gard. 1: 427–443. *4 figs.* July, 1918.—Author studied shepherd's-purse (*Bursa bursa-pastoris*) from many parts of world and found that rosettes in general are of four types previously reported, i.e., *heteris* (with leaf factors *A B*), *rhomboidea* (*aB*), *tenuis*, (*Ab*), *simplex* (*ab*). In previous papers extension of leaf lobing to midrib was ascribed to one gene *B*. Wild plants from Peking, Vicenza, Berlin, Landau (Germany), Groningen, Cardiff, Chicago, New Carlisle (Ohio), show this monomeric condition of "B"-lobing, as evidenced by approximate 3 to 1 F_2 ratios when parents with and without "B"-lobing are crossed. Shepherd's-purse of *heteris* type from Tucson, Arizona, proved exceptional; crossed with a *simplex* type it gave F_2 ratio of *B*: *b* of 10.91 : 1. Another F_2 group of same origin gave F_2 ratio of 6.46 : 1 under conditions which tend to suppress dominant characters. 29 such F_2 plants with "B"-lobing gave in F_3, 19 families with "B"-lobing in all individuals, 3 families with about 15 : 1 ratio of *B* to *b*, and 7 families with approxi-

mate 3:1 ratios; expected 14:8:8. Several of the 19 *B*-containing families contained small numbers. Author concluded that in Tucson type, duplicate genes *B* and *B′* determine "B" type of lobing. Biotypes from Groningen, Bremen, Berlin, Cardiff, and probably Peking, also have this dimeric "B"-lobing. Morphological complexity of character produced by *B* and B′-factors indicate that duplication occurred through physical rearrangement of genotype rather than by repeated mutation, affecting in like manner chromosomes belonging to distinct pairs.—*J. P. Kelly.*

936. Siemens, Hermann W. **Das Erfindergeschlecht Siemens. [The Siemens family of inventors.]** [Review by Fritz Lenz, from Archiv f. Rassen- u. Gesellschaftsbiol. **12**: 163–192.) Zeitschr. indukt. Abstamm. u. Vererb. **19**: 95. Mar., 1918.

937. Singer, Kurt. **Bemerkenswerter Fall von Thomsencher Krankheit.** [Abstract by Kurt Mendel, from Monatsschr. f. Psych. u. Neurol. 41⁴. 1917.] Neurol. Centralbl. **1918**: 125. Feb., 1918.

938. Sommer, Robert. **Friedrich der Grosse vom Standpunkt der Vererbungslehre.** [Abstract by Kurt Mendel, from Sommers Klinik f. Psych. u. nerv. Krankh. 10¹. 1917.] Neurol. Centralbl. **1918**: 118. Feb., 1918.

939. Stout, A. B. **Experimental studies of self-incompatibilities in fertilization.** Proc. Soc. Exp. Biol. and Med. **15**: 51–54. 1918.—Summary of previous publications on sterility in *Cichorium Intybus.* Results obtained indicate (*a*) that self- and cross-incompatibilities are strongly in evidence in this species; (*b*) that self-compatible plants may arise sporadically from parents that are self-sterile even after three generations of self-incompatible ancestry; (*c*) that the progeny of such plants do not breed true to this character; (*d*) that the degree of self-compatibility varies greatly; (*e*) that selection for high degrees of self-fertility continued for four generations has not been effective in isolating a completely self-fertile strain. Self-compatibility and self-incompatibility are entirely independent of differences in vegetative vigor; they operate independently of potential sex vigor; they may operate independently of the purely nutritive relations of embryos to their parent plants; they appear independently of any combination of germ-plasm elements in so far as these can be judged by the expression of characters and their development occurs in both cross-bred and inbred races. Results obtained in chicory make it clear that self-incompatibility and self-compatibility are not to be described as dominant and recessive characters, or paired allelomorphs, and there is no simple Mendelian formula that fits the results. Evidence of similar phenomena in other species considered to be quite in agreement with this conclusion. Factors controlling sex fusions arise in connection with development of sex organs and sex cells as such and are of epigenetic and individual development and are highly variable as to degree, specificity, and transmission in heredity. Phenomenon appears to present some analogy to that of so-called antigen-antibody reactions in immunity, and to isoagglutination and isoprecipitation phenomena.—*D. F. Jones.*

940. Stout, A. B. **Duplication and cohesion in the main axis in Cichorium Intybus.** Mem. Brooklyn Bot. Gard. **1**: 480–485. 1918.—Terms duplication and cohesion are used to designate special type of fasciation of main axis observed in horticultural variety "red-leaved Treviso" of *Cichorium Intybus.* This differs from banded and cone types in that two stem elements of equal size are clearly in evidence. Fasciation is confined to middle and lower portions of stem, main axis often becoming simple at its apex. Degree and extent of duplication are illustrated and described. Torsion is frequently seen. Phyllotaxy is discussed. Seedling abnormalities consisting in reduction or fusing of cotyledons or absence of plumule are described. Author concludes that character is strongly but not completely heritable. Wide variation in degree of duplication in different individuals, and wholly normal plants may occur. Duplication is incompletely dominant in F_1 generation of cross with normal, both as to degree of expression and number of plants affected.—*J. A. Harris.*

941. Stargardt, K. **Über familiäre Degeneration in der Maculagegend des Auges mit und ohne psychische Störungen.** [Abstract by Kurt Mendel, from Arch. f. Psych. 58^{1-2}. 1917.] Neurol. Centralbl. **1918**: 122. Feb., 1918.

942. Straus, H. **Dominanz und Rezessivität bei Weizenbastarden.** **[Dominance and recessiveness in wheat hybrids.]** [Review by G. v. Ubisch, from Diss. Göttingen. *8vo, 38 p. 1 pl.* 1914.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 139. Mar., 1918.

943. Sumner, F. B. **Continuous and discontinuous variations and their inheritance in Peromyscus. III.** Amer. Nat. **52**: 439–454. Aug.–Sept., 1918.—Mutations in four geographical races of deer mice are described. (*1*) Partially albinic mutant strain with red eyes, no pigment on ears and tail and very pale gray fur, strongly tinged with shade of yellow, approaching "ochraceous buff" is called "pallid." Behaves as recessive to fully pigmented strain. Its complete segregation is in striking contrast to apparent lack of segregation in respect to sub-specific characters which entered into germinal constitution of these same individuals. Of forty-seven F_2 offspring obtained from mating of F_1 *P. sonoriensis rubidus*, four were "pallid." These were progeny of six different fathers and eleven different mothers. The four putative mutants were offspring of single father mated with two of his own sisters. These mothers, by same father, also produced seven dark young. Author believes that these "pallid" mice are true mutants, appearing *de novo* in his cultures and that it is probable that hybridization of such diverse strains was the disturbing element that led to loss or modification of a gene. (*2*) A yellow mutant from *P. maniculatus gambeli* have larger number of yellow-banded hairs, in proportion to those which are black throughout their entire length, and yellow zone of each hair, occupies on average, considerably larger proportion of its length. On mid-ventral surface, the basal, plumbeous zone is lacking, the hairs being entirely white. These "yellow *gambeli*" came from five parents normally-colored *Peromyscus maniculatus gambeli* (La Jolla race). They produced twenty-one offspring, fourteen of which were normal and seven "yellow *gambeli*." Their origin is uncertain. In inheritance they behaved as simple monohybrid recessives. "Yellows" bred to "yellows" have produced only "yellows." The "pallid" crossed with "yellow *gambeli*" produced one offspring with dark pigmented skin, hair and eyes, the two yellow mutants seeming to be complementary to one another, as were Castle's two yellow races of rats. (*3*) "Grizzled," a mutant distinguished by white hairs on face. These were discovered in second cage-born generation of *gambeli*. Three mice were found all having descended from same grandparents but not of single fraternity. Their parents and grandparents did not show the "grizzled" character. One specimen also was discovered in second cage-born generation of *P. m. sonoriensis*. "Grizzled" character is hereditary. (*4*) A caudal skin pigmentation of *P. rubidus* is a hereditary character. (*5*) White-tipped snout due partly to absence of skin pigment and partly to presence of white hair, appearing in dark race of *rubidus*, is monohybrid recessive mutant.

Author discusses inheritance and variation of these characters on basis of multiple factor hypothesis and of Castle's view of "potency of a unit factor." He states that burden of proof rests upon those who contend that continuous and discontinuous variation and inheritance are reducible to single category, that of discontinuity. "Anything like a proof of this contention appears to be rather lacking."—*B. O. Severson.*

944. Sutton, Arthur W. **"Rogues" among potatoes.** Gard. Chron. **64**: 142. Oct. 5, 1918.—Tubers of Jackson's new variety thought to have arisen by bud-mutation, were found by author to resemble Up-to-date. Quotation by Jackson from Darwin's *Variation of animals and plants under domestication*, chapter 11, p. 410, shows Darwin observed only bud variations in color of skin. Similar bud-mutations are known to all experienced growers. Examples cited are Old Rector of Woodstock which gave potato with skin mottled purple and white, and white sports of Fortyfold and Beauty of Hebron. Other characters of such variations are indistinguishable from original stocks. Bud-mutation of wild *Solanum commersonii* noted by M. Labergerie as giving rise to a large coarse-growing red or violet-skinned

potato was proved by the late M. Philippe Vilmorin and writer to be Blue Giant introduced by Polsen in Germany. Heckle's "mutations" raised from *Solanum commersonii* were also found to have arisen under unsuitably controlled conditions.—*H. K. Hayes.*

945. SUTTON, IDA. **Report on tests of self-sterility in plums, cherries, and apples at the John Innes Horticultural Institution.** Jour. Genetics 7: 281–300. *3 fig.* Aug., 1918.—Horticultural and genetic study of self-sterility. No evidence found against the view that self-sterility is recessive. No satisfactory cases of failure to set fruit in cross-pollinations which could be surely attributed to cross-incompatibility. Out of many crosses made in the three kinds of fruit only four varieties of plums were found to be cross-sterile but two of these varieties known to have originated from one of the four by bud-mutation and the other is suspected of having similar origin. Varieties studied are classified as self-sterile, partly self-sterile and self-fertile. Tables of the pollinations made and their results are appended, together with three illustrations.—*D. F. Jones.*

946. THOMSON, J. ARTHUR. **On sexual selection.** Scientia 24: 22–32. 1918.—Darwin's theory of sexual selection can no longer be accepted in precise form in which he stated it, but it appears that many of his postulates may still be considered wholly or partly valid. Unfortunately term had double meaning, first as applicable to any events connected with sex which gave certain individuals preference over others in respect to mating and production of young; and second, having to do with conscious choice or selection of certain males by females. Now as regards first and more general application of the term, no one who has faith in natural selection can doubt that this operates in special and important ways during the mating period. So-called sexual selection is here nothing more than phase of natural selection. When, however, we postulate a discriminating esthetic sense on part of females, sufficient to distinguish between variations appearing in males, our credulity is more seriously taxed. Author, after reviewing number of post-Darwinian publications dealing with subject, concludes that phenomena connected with courtship certainly produce reactions or emotional states, and that it is not necessary to suppose that females discriminate in esthetic or intellectual manner. Furthermore it can be shown that secondary sexual characters, having at first no significance apart from sex, frequently contribute to richness and variety of life and are thus double advantageous to the race.—*T. D. A. Cockerell.*

947. TROW, A. H. **On "albinism" in Senecio vulgaris L.** [Abstract by E. Lehmann, from Jour. Genetics 6: 65–74. 1916.] Zeitschr. Bot. 10: 133–137. 1918.

948. TUPPER, W. W., AND H. H. BARTLETT. **The relation of mutational characters to cell size.** [Abstract by Cyril West, from Genetics 3: 93–106. 1918.] Physiol. Abst. 3: 355. Sept., 1918.—See Bot. Absts. 1, Entry 50.

949. WALTON, L. B. **Organic evolution and the significance of some new evidence bearing on the problem.** Amer. Nat. 52: 521–547. *5 fig.* Oct.–Nov., 1918.—How hereditary character-forming genes were first called into existence, not evolution as a process, nor methods by which characters are inherited, is to-day the important biological problem. Author discusses various trends of genetical discovery and speculation, and states that critical students have not been convinced that environmental stimuli account for new genetic factors. Recurrent "mutations" and parallel mutations in different species cause one to distrust force of mutations in evolution; for one may well believe that any particular mutation under observation sufficiently long, will exhibit recurrent changes. Since differentiation of species in Drosophila may have taken place two, or more, millions of years ago, genes common to the two species *melanogaster* and *virilis* may have been preformed for long period of time. From studies of Lillie, Morgan, Woltereck and others on direct and indirect effects of changed metabolism, author concludes that heredity hands down frame-work which within certain limits allows plasticity in development, and that direction of development is determined by physico-chemical influences through suppression of potential units. He also con-

cludes that breeders are "largely, if not entirely, engaged in presenting new combinations of existing units," rather than in the discovery of production of new units. He then inquires whether there may not be evidence, even though circumstantial, which permits new insight, and suggests that turning of earth on its axis, causing sun to appear to move from east to west, may have brought negatively phototactic microorganisms of northern hemisphere to rotate as a rule in reverse, or counter-clockwise direction. With two exceptions, positively phototactic forms rotate clockwise in northern hemisphere. Reverse situation appears to prevail in southern hemisphere. The flagellum is assumed to be orienting organ which is affected by sun. Final conclusion reached is that primary factors of evolution are environmental and thus dynamic.—*R. K. Nabours.*

950. Westphal, A. **Beitrag zur Lehre von der amaurotischen Idiotie.** [Abstract by Kurt Mendel from Arch. f. Psych. 58^{1-3}. 1917.] Neurol. Centralbl. **1918**: 122. Feb., 1918.

951. Wexberg, E. **Eine neue Familie mit periodischer Lähmung.** [Abstract by Pilcz, from Jahrb. f. Psych. **37**: 1917.] Neurol. Centralbl. **1918**: 120. Feb., 1918.

952. White, O. E. **Inheritance studies on castor beans.** Mem. Brooklyn Bot. Gard. 1: 513–521. *6 pl.* July, 1918.—Data for F_1 and F_2 of crosses involving five pairs of characters,—green, red blush, mahogany and rose stem colors, seed color patterns, and bloom,—indicate simple Mendelian inheritance. Dehiscent and indehiscent capsules are thought to involve two factor pairs. F_1 of small × large seeds intermediate, F_2 graded series from size of large parent to that of small parent or smaller. Extreme sizes and some intermediates of F_2 bred true while other intermediates exhibited different ranges of variation in F_3. Stature, season of maturity, leaf shape, and spike density were studied less fully. F_1 plants of some crosses showed increased seed production and of other crosses no increase over parents.—*R. A. Emerson.*

953. Winge, Ø. **Studier over Planterigets Chromosomtal og Chromosomernes Betydning** [Review by G. Tischler, from Dissert. Kobenhavn. *143 p., 1 pl., 46 fig.* 1917.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 126–130. Mar., 1918.

954. Wrzosek, Adam, and Adolf Maciesza. **Über die Entstehung, den Verlauf und die Vererbung der durch Rückenmarksverletzung hervorgerufenen Meerschweinchen-Epilepsie. [On the origin, the progress and inheritance of epilepsy, induced in the guinea-pig by injury to the spinal cord.]** [Review by H. W. Siemens, from Archiv. f. Rassen- u. Gesellschaftsbiol. **11**: 289. 1914–1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 109–110. Mar., 1918.

955. Zederbauer, E. **Alter, Vererbung und Fruchtbarkeit. [Age, inheritance and fruitfulness.]** [Review by E. Schiemann, from Verh. k. k. zöol. bot. Ges. **61**: 81–87. 1917. Zeitschr. indukt. Abstamm. u. Vererb. **19**: 138–139. Mar., 1918.

956. Zederbauer, E. **Untersuchungen über das Gelingen von Bastardierungen zwischen ungleichalterigen Individuen von Pisum sativum. [Investigations on the success of hybridization between individuals of Pisum sativum of unlike age.]** [Review by E. Schiemann, from Zeitschr. f. Pflanzenzücht. **3**: 63–67. 1915.] Zeitschr. indukt. Abstamm. u. Vererb. **19**: 138. Mar., 1918.

HORTICULTURE

W. H. Chandler, *Editor*

[Unsigned abstracts are by the editor.]

957. Alderman, W. H. **Experimental work on self-sterility of the apple.** Proc. Amer. Soc. Hort. Sci. **14**: 94–101. 1918.—This is a preliminary report on extensive work with the problem of the self-sterility in the apple, that the author and his associates are doing.—As

to the details of the work muslin frames were found to be a better covering for the blossoms to be studied than the ordinary paper bags. The set, however, of nearly self-sterile varieties was greater when the blossoms were isolated under paper bags than under the muslin frames. The varieties studied were Rome Beauty, York Imperial, and Wagener.

During the progress of the work about one hundred and fifty thousand flowers have been pollinated and records have been kept of their subsequent behavior. Both Rome Beauty and York Imperial were found nearly self-sterile, but not entirely so. In the case of the Rome Beauty fertilized with Rome Beauty pollen, there was no greater set when the pollen was taken from a separate tree. This same is true of the York Imperial. As to the benefits of cross-pollination with Rome Beauty, the percentage of set was increased 3½ times, with York Imperial 14 times, and with Wagener 7 times, by cross pollination. Much fewer blossoms of Wagener were studied, however, than with the other varieties. The size of the fruit was increased 27.8 per cent. by cross pollination in the case of the Rome Beauty; 42.7 per cent. in case of Wagener.

Some data are presented which seem to indicate that the percentage of set is greater in the case of emasculated blossoms than in the case of blossoms not emasculated. The average number of seed found in self-fertilized Rome Beauty was 3.5; in cross-fertilized 7.1; in self-fertilized York Imperial 2.7; in cross-fertilized 7.0; in Wagener self-fertilized 1.06; Wagener crossed 6.88.

The author suggests this as an explanation of the greater size of the cross pollinated fruit. Germination tests showed that the pollen of the partially self-sterile varieties is viable, and also, that the pollen grains seem to germinate equally well in the stigmatic fluid of their own or other varieties. As a practical test of self-sterility in a Rome Beauty orchard, bees were placed in one section and blooming branches of other varieties were placed among the trees. The percentage of set in this section was 12.6 per cent. against 7.8 per cent. in the section where the trees bloomed equally well, but at the farthest side of the orchard from the bees.

Trees near a Ben Davis tree in the orchard gave 20 per cent. of set. On the following year the percentage of set was in the bees' section 8.3 per cent., in the check 4.3 and near the Ben Davis 15.9 per cent.

958. Breazeale, J. F. **The mulch basin system of citrus culture.** California Citrograph 3: 232. Aug., 1918.—A modification of the mulch basin system is recommended for citrus orchards as a means of reducing the cost of cultivation and conserving soil moisture and organic fertilizing materials. The scheme proposed consists in a combination of the trench and mulched basin systems, the organic materials for use in which to be grown as cover crops between the tree rows. No experimental evidence is offered.—*W. G. Kelly.*

959. Cruess, W. V. **Orange vinegar instead of apple produced here.** California Citrograph 3: 257. Sept., 1918.—Vinegar of good quality was made in a number of tests in the Citrus By-Products Laboratory of the U. S. D. A., Los Angeles. The process recommended is:—Press out juice from crushed whole fruit. Leave in barrel or wooden tub at about 85°F. until fermentation is complete (3–5 days). Strain the juice. Place in barrel generator previously acidified with unsterilized vinegar. Plans for barrel generator are given. When the vinegar is finished remove from barrel, bottle and pasteurize.—*W. V. Cruess.*

960. Dahl, A. L. **Where pineapples come from.** California Cultivator 51: 417. *Fig. 1.* Oct. 26, 1918.—The science of canning has made it possible for dwellers in every country to enjoy the pineapple in a high degree of quality. The pineapple grows wild in most tropical countries and is exported commercially from the West Indies, Bahamas and Hawaii. In the early 90's, millions of the fresh fruits were canned in Baltimore and a regular line of steamers was operated to carry the fruit from the West Indies. Although pineapple canning is still carried on at Baltimore, the greatest development of the industry has taken place in Hawaii where the packing plants represent the last word in cleanliness and efficiency. The industry has rapidly grown from a production of 2000 cases in 1901 to almost 3,000,000 cases in 1917.

The canning factories are now located mostly in Honolulu, the fruit being shipped not over twenty-two miles from the plantations. Details of the process of harvesting, preparation for canning, and the actual canning process are described.—*I. J. Condit.*

961. Eaton, F. M. **Efficiency in citrus irrigation.** *16 p.* San Diego Land Corporation, Chula Vista, California, 1918.—In this paper, which was delivered as an address before the Synapsis Club at the Citrus Experiment Station, Riverside, the author summarizes some general considerations affecting citrus orchard irrigation in Southern California and appends an account of the method used by one large orcharding company in regulating the time between irrigations and the amount of water applied, on the basis of laboratory soil moisture determinations. The system used has for its basis the determination of the moisture equivalents and wilting coefficients of the different types of soil involved and an attempt is made to keep the soil moisture content as near the former as possible, it being deemed that this constant approximates the optimum moisture content. A full description of the apparatus used and methods pursued is given. Methods of furrowing as adapted to different soil types are considered. The contention is made that fully as many orchards suffer for lack of sufficient water as on account of over-irrigation. Some relations of the penetration of irrigation water and root distribution to irrigation practice are brought out. A coöperative system for a rational irrigation practice in citrus orchards is suggested.—*R. W. Hodgson.*

962. Floyd, B. F. **Injury to citrus trees by the improper use of ground limestone.** Rept. of Plant Physiologist. Florida Agric. Exp. Sta. **1917**: 35 R–46 R. May, 1918.—In pot experiments with citrus trees the presence of ground limestone produced a distinct injury characterized by two types of yellowing: (a) a frenching, or lack of green color in the areas between the largest veins, and (b) a chlorosis consisting of a more or less complete yellowing or whitening of the leaves. Both types had a quantitative relation to the limestone in the soil and more injury was induced in sandy soils than in loam soils. Both cottonseed meal and sulphate of ammonia, when applied to plants growing in soil containing no limestone, produced frenching but not complete chlorosis.—*R. D. Anthony.*

963. Kinman, C. F. **The mango in Porto Rico.** Porto Rico Agric. Exp. Sta. Bull. 24. *30 p. Pl. XI.* Feb. 4, 1918.—The common mango of Porto Rico, which is one of the most important fruits of the island, is not cultivated but grows wild in all localities. Superior varieties lately imported have proved satisfactory and should be planted extensively for market and home use.—Mango trees are adapted to a wide range of soil types and will grow satisfactorily in practically all Porto Rican soils, provided there is a good subdrainage.—While the climate throughout the island is suitable for the growth of mango trees, in some localities, notably through the interior and along the northern slopes, rains are sometimes too frequent during the blossoming season to permit the setting of a good crop of fruit. Along the western and northern lowlands rainfall is light during the blossoming season and good crops are almost invariably secured.—As the prevailing winds and morning sun seem to be very beneficial, both for growth of trees and setting of fruit, open, exposed sites should be selected for the mango orchards.

Inarching and bark grafting, simple methods for asexual propagation, are satisfactory both for use in the nursery and for topworking large trees. The important conditions in grafting are that the stock be just starting a new growth, the scion mature, and the buds ready or almost ready to open.—Large seeds which produce only one plant are most satisfactory for stocks. The East Indian varieties produce larger and more thrifty plants, as a rule, than the native kinds. Both nursery and other mango trees may be transplanted successfully if they are not making a new growth and rainfall is plentiful.

The present confusion in the classification of types of mangoes, as well as the great variation in growth and productiveness of trees, and quality of fruit, necessitates a thorough study of varieties before a mango orchard can be successfully planted in Porto Rico.—Among a number of imported varieties that have fruited here, the most productive of the thrifty kinds with fruits of high quality are Cambodiana, Totafari, Amini, Bennett, and Paheri.

Cambodiana and Paheri are probably better suited to home than to commercial use.—The trees of the few varieties from Martinique, Trinidad, and South America thus far tested lack vigor, while the fruits are either inferior in quality or too small to be promising for general planting. As regards size, flavor, fiber content, and keeping quality, the wild Porto Rican mangoes are less desirable than many imported kinds.

In harvesting mangoes that have not softened on the tree, a stem longer than a fruit stalk should be left to prevent the juice from escaping through the fruit stalk and leaving passages for the entrance of infection.—Fruits in orange wrapping paper did not ripen or decay so quickly as those wrapped in oil paper, newspaper, or coconut fiber, or those left in the open air. Fruits packed in coconut fiber ripened earliest.—East Indian varieties showed much better keeping qualities than the native kinds.

The mango is one of the most satisfactory ornamental trees for Porto Rico, as variations in habits of growth and color of foliage make it possible to select from varieties producing fruit of high quality those which best carry out a particular scheme of landscape gardening.—*I. J. Condit.*

964. Knight, L. J. **Physiological aspects of self-sterility of the apple.** Proc. Amer. Soc. Hort. Sci. 14: 101–105. 1918.—The work was done largely with Rome Beauty pollinated by Rome Beauty and Rome Beauty pollinated by Jonathan. The material was killed by Gilson's fluid and preserved for study in 70 per cent. alcohol.—The studies indicate that there is no stylar canal, and the pollen tubes make their way through the tissue. There is decomposition of the cells along this path or extrusion of mucilage. The progress of Jonathan tubes in Rome Beauty pistils seems to be facilitated, while that of Rome Beauty seems to be hindered. The embryo in Rome Beauty cross Jonathan at 192 hours was 2 to 3 celled, and by 240 hours was many celled. There was a marked effect of temperature on the rate of growth of Rome Beauty cross Rome Beauty tubes.—At a moderate temperature Rome Beauty tubes require 91 to 120 hours to traverse the Rome Beauty style. At a temperature of 80° to 90°F. only 24 hours were required. At moderate temperatures fertilization occurred within 24 hours in case of Rome Beauty cross Wagener and Wagener cross Rome Beauty.

The author thinks that occasional self-fertility may possibly be explained by the effect of high temperature on the rate of growth of the pollen tube. Asparagin (a trace) in 3 per cent. fructose solution increased rate of growth of the pollen tube. In a pollen tube 5 hours old one-twentieth mm. long 2 to 4 plugs are forming and the pollen tube is very soon shut off from the pollen grain and must, therefore, secure its nourishment from the stylar tissue.—The author draws the following conclusion:

(1) Self-sterility of Rome Beauty is not due to sterility of the pollen, as has been shown to be the case in certain varieties of grapes.

(2) Sensitiveness of pollen to overabundant moisture supply is not involved here as a factor, as has been shown by Jost for the pollen of many grasses, barley especially; and by J. N. Martin for the pollen of red clover. The pollen of Rome Beauty and many other varieties germinated well in distilled water.

(3) Rome Beauty stigmatic extract offers no inhibition to the germination and growth of Rome Beauty pollen.

(4) Rome Beauty stigmas offer no particular mechanical obstruction to the penetration of Rome Beauty tubes.

(5) Self-sterility of Rome Beauty is not due to inability of its own pollen tubes to grow deep enough to reach the egg. This has been suggested as the cause of self-sterility in certain pear and apple varieties by the work of Osterwalder.

(6) From present indications one important factor in self-sterility of Rome Beauty is the relatively slow rate of growth of Rome Beauty tubes in Rome Beauty stylar tissue. Doubtless other factors will be found upon further investigation.

965. Latham, Consul C. L. **The orange oil industry in Jamaica.** California Cultivator 50: 261. Mar. 2, 1918.—The orange oil industry in Jamaica dates from the Messina earthquake in 1908 which temporarily demoralized the Sicilian oil industry. The oil is extracted

on a "rinder" which is a shallow, tin-lined copper vessel studded thickly with copper tacks ¾ inch long, pointing upward and inward. The bottom consists of a funnel shaped oil receptacle which can be closed at lower and smaller end. The rinder is placed between the press; the orange is rolled on the points until no more oil exudes. When the receptacle is filled, the oil is poured through a cloth. Frequently the oil must be allowed to settle to remove mucilage and juice. It is filtered into copper containers lined with tin. Mechanical rinders have been unsuccessful. Work is done by women and children at low wages. Yield of oil is low. The rinders are carried to the scattered trees and the oil is extracted on the spot. This reduces transportation costs. Fruit must not be too ripe or dark colored oil will result. Twelve hundred oranges yield 2½ pounds of oil. Eight hours work is necessary to give 1 pound of oil per worker. Oil of best quality is secured when extracted early in the morning. Extracted oranges are discarded or fed to stock.—*W. V. Cruess.*

966. Markarian, Henry. **How we can improve the quality of our dried figs.** California Cultivator 50: 100. Jan. 26, 1918.—Contains practical advice to fig growers.

967. Miller, C. C. **Bud curl of the lemon tree.** Monthly Bull. California State Comm. Hort. 7: 515–519. *Figs. 70–74.* Sept., 1918.—Bud curl is a term used by the writer for the enlargement of the trunks of lemon trees just above the bud-union where a piling-up of woody material goes on from year to year. The accumulation of this woody material results in extreme cases in a condition designated as "bud pinch" which constricts the bark and prevents the free passage of elaborated plant food to the roots. Some improvement can be gained by cutting through the bark from an inch below to an inch above the pinched area. If the pinching has continued for several years and the tree has suffered as a result, it is recommended that the tree be removed and a new one planted.—*I. J. Condit.*

968. Popenoe, W. **Agricultural explorations in Mexico.** California Citrograph 4: 2. Nov., 1918.—As an agricultural explorer for the University of California, Mr. Popenoe reports the results of investigations made in different parts of Mexico during 1918. His studies were made in Tampico, State of Tamaulipas and the State of Vera Cruz. Notes are given regarding the occurrence of Avocados, Chayotes, Mangos, Annonas, and a species of Attalea, the seed of which are utilized for oil.—*I. J. Condit.*

969. Taylor, R. H. **The almond in California.** California Agric. Exp. Sta. Bull. 297. *P. 1–72, fig. 28.* 1918.—Reports results of observation and study of almond industry in more important districts of California for past six years.—Concerning the habit of the almond plant, it is the first of deciduous fruit trees to start growth and bloom in spring and normally the last one to shed its leaves in fall; has a short rest period; young trees may bloom three or four days later than old trees; the wood is very hard and strong, but somewhat subject to heart rot, and all varieties are self-sterile and some are inter-sterile. Thus Nonpareil and I X L are inter-sterile; also Languedoc and Texas and I X L with Peerless. The nuts are of two general classes—sweet and bitter.

When properly pruned and conditions of soil and moisture are favorable the nuts grow and ripen more satisfactorily in the greater heat of the interior valleys than along the coast. The tree is considered hardy and able to endure fully as much cold as the hardiest peach, without injury. Blossoms with petals beginning to fall have in some cases withstood 28°F. In other cases temperatures of 30° and 31°F. have killed blossoms with the petals falling. The duration of these temperatures is not given. After the young fruit has attained the size of a pea it rapidly becomes less resistant to low temperatures.—Practical directions for growing, including disease and insect control and for harvesting are given with discussion of varieties and classification.—*E. L. Overholser.*

970. Wilson, C. P. **Summary of talk on lemon by-products.** California Citrograph 3: 140, April, 1918.—About 6 per cent. of crop of members of Exchange By-Products Co. shipped to factory at Corona last season. The calcium citrate made by this company contains about 70 per cent. citric acid compared to a possible 73.7 per cent. The Exchange Company's

citrate averages about 6 per cent. higher in citric acid content than does the usual commercial citrate. During 1916–17 season the Company used 5120 tons of lemons; produced 180,000 pounds of citric acid and returned $10 per ton to growers; this is $4 per ton better than previous season. Estimated increase in lemon crop for next six years is 114 per cent. If present rate of increase in consumption of fresh fruit is increased five times it will still leave 60,000 tons of fruit to be disposed of. Lemon oil and citric acid must form basis for their utilization. This amount of fruit will yield 500,000 pounds of lemon oil, and 500,000 pounds of citric acid, or provide half of present consumption of acid in United States and all our lemon oil there consumed. Value conservatively of $1,600,000. Authorized capital of the Company is now increased to $200,000 to permit development of other products. Manufacture of oil and candied, dried or brined peel contemplated. By-products are made at cost. All dividends are returned to members of the Exchange, who are growers.—*W. V. Cruess.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor*

[Unsigned abstracts are by the editor.]

[NOTE. The title of this section is wrongly printed in previous issue of Bot. Absts. (vol. I, p. 99), where "of vascular plants" should be deleted. With the coming rearrangement of sections the restricted title will apply, but is not yet in force.—*Ed.-in-Chief.*]

THALLOPHYTES

971. Atkinson, G. F. **Development in gymnocarpous Agaricaceae.** Bot. Gaz. **66**: 459–460. 1918. [Review of: Douglas, Gertrude E. The development of some exogenous species of agarics. Amer. Jour. Bot. **5**: 36–54. *Pl. 1–7.* 1918; and Blizzard, A. W. The development of some species of agarics. Amer. Jour. Bot. **4**: 221–240. *Pl. 6–11.* 1917.]—Summary of chief results of these two papers. Reviewer notes that in gymnocarpous forms the origin and general course of development of hymenophore corresponds with that of angiocarpous forms of the Agaricus type. [See Bot. Absts. 1, Entry 65.]

PTERIDOPHYTES

972. Bower, F. O. **Studies in the phylogeny of the Filicales. VII. The Pteroideae.** Ann. Bot. **32**: 1–68. 43 *fig.*. 1918. [Abst. by Coulter, J. M., Bot. Gaz. **66**: 183. 1918.]—See Bot. Absts. 1, Entry 62.

973. Chamberlain, Charles J. **Prothallia and sporelings of lycopods.** Bot. Gaz. **65**: 565–568. 1918. [Review of: Holloway, J. E. A comparative study of the anatomy of six New Zealand species of Lycopodium. Trans. New Zealand Inst. **42**: 356–370. *Pl. 31–34.* 1909. Idem. Studies in the New Zealand species of the genus Lycopodium. Part I. *Ibid.* **48**: 253–303. *Pl. 17, 18. 102 fig.* 1916. Idem. Studies in the New Zealand species of the genus Lycopodium. Part II. Methods of vegetative reproduction. *Ibid.* **49**: 80–93. *Pl. 8, 9, 24. fig.* 1917. Lawson, A. Anstruther. The prothallus of *Tmesipteris tannensis.* Trans. Roy. Soc. Edinburgh **51**: 785–794. *Pl. 1–3.* 1917. Idem. The gametophyte generation of the Psilotaceae. *Ibid.* **52**: 93–113. *Pl. 1–5.* 1917.]—Reviewer summarizes Holloway's work on comparative anatomy and on prothallia of the New Zealand species of Lycopodium. The radial type of stele is believed to be primitive and the banded type derived from it. Considerable variation in stelar anatomy of adult plant is noted. Prothallia of 10 species are described, several of them for the first time, but no type strictly new to the genus is discovered. Methods of vegetative propagation are dealt with. Author believes that various sections of genus have not been separated from very ancient times but are rather closely interrelated.

Reviewer summarizes Lawson's work on prothallia of Tmesipteris and Psilotum. He takes issue with author's statement that gametophyte of Psilotum bears no structural

resemblance to that of Lycopodium, and believes that evidence from prothalia indicates relationship between Psilotales and Lycopodiales.

974. Kashyap, S. R. **Notes on Equisetum debile Roxb.** Ann. Bot. 31: 439–445. 3 *fig.* 1917.—Endodermis and prothallium were studied and position of former is described. Character of prothallium varies according to thickness with which spores are sown. [From abst. by Coulter, J. M., Bot. Gaz. 65: 491. 1918.]

975. Steil, W. N. **Studies of some new cases of apogamy in ferns.** Bull. Torr. Bot. Club. 45: 93–108. *Pl. 4, 5.* 1918. [Abst. by Coulter, J. M., in Bot. Gaz. 66: 80. 1918.]—See Bot. Absts. 1, Entry 276.

SEED PLANTS

976. Brown, Mabel Mary. **The development of the embryo sac and of the embryo in Phaseolus vulgaris.** Bull. Torrey. Bot. Club 44: 535–544. *Pl. 25, 26.* 1917.—Morphology of this species presents nothing unusual. [From abst. by Coulter, J. M., Bot. Gaz. 65: 376. 1918.]

977. Buchholz, John Theodore. **Suspensor and early embryo of Pinus.** Bot. Gaz. 66: 185–228. *Pl. 6–10, 3 fig.* 1918.—Embryos with basal portions of old archegonia and suspensors were taken from living ovules by removing upper portion of gametophyte and teasing them out. These were stained and mounted *in toto*. At time of fertilization starch grains appear in cells of gametophyte just beneath archegonia. Prior to elongation of suspensors, these starch-containing cells break down and form the corrosive cavity into which developing embryo is pushed by growth of suspensor. Each of the 4 cells in the embryonal group of proembryo is an apical cell. These do not divide until after tier of suspensor cells has begun to elongate. By two successive divisions the apical cells cut off first and second embryonal tube initials; these elongate, forming secondary suspensors. The 4 vertical rows of cells thus formed always separate and develop 4 embryos, thus producing polyembryony by cleavage. A primary suspensor tube never divides to form 2 tubes, but embryonal tube initials may, before elongation, divide by periclinal walls into 2 or more cells all of which elongate together. As succeeding embryonal tubes are cut from apical cell, they divide by vertical walls. When cell walls are laid down in the proembryo, the cells at the organic apex begin to function as apical cells. The primary suspensor and from 2 to 4 embryonal tubes are cut off from one face of apical cell before the tetrahedral apical cell is organized. This apical cell with three cutting faces persists until a cylindrical body of several hundred cells is formed, nearly all of which later take part in the formation of the secondary suspensor. The rosette cells are embryo initials. These embryos grow by apical cells with three cutting faces, but growth ceases before they reach any considerable size. Thus an archegonium normally produces 8 embryos. In some cases the rosette cells elongate and resemble the suspensor except that their cells divide and those of the primary suspensor never do. No evidence was found that twin embryos may arise by splitting of one of the 4 primary embryos, and no seeds were found in which two of the primary embryos had developed equally and fully. The first body region to appear is the plerome of root tip; stem tip occurs in position formerly occupied by apical cell and is followed by ring of cotyledonary primordia. Number of primordia varies from 3 to 7; in some instances 2 were found to fuse to form one cotyledon, but at no stage is a cotyledonary tube formed.—A number of abnormalities are cited, the most striking being frequent occurrence of 2 gametophytes in same ovule of *P. Banksiana*. Author discusses development of embryo in Pinus in relation to that of other conifers and concludes that "Pinus is a very primitive and ancient genus."—*Margaret C. Ferguson.*

978. Harvey, LeRoy H. **Polyembryony in Quercus alba.** Michigan Acad. Sci. Rept. 1917: 329–331.—Records a case of polyembryony in *Quercus alba* and gives a summary of recorded cases of polyembryony in angiosperms. [From abst. by Coulter, J. M., Bot. Gaz. 66: 184. 1918.]

979. Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 277–317. *pl. 1, 14 fig.* 1918.—*O. nutans, O. pycnocarpa* and their hybrids were studied. An axial row of 4 megaspores is formed. The micopylar or chalazal spore or both may develop into embryo sacs. Mother cell of embryo sac remains at micropylar end and divides twice. Mature embryo sac is tetranucleate with normal well defined egg apparatus but with no antipodals or chalazal polar. Polar nucleus increases in size, becoming identical in appearance with an ordinary endosperm nucleus which results from fusion of polar nuclei. Members of the egg apparatus are surrounded by cellulose walls, but this wall does not extend over lower part of oosphere. Rod- or biscuit-shaped structures suggesting chondriosomes were sometimes found in egg cell. When shed, pollen grain contains a vegetative nucleus and a generative nucleus and is packed with fusiform starch grains. Forty-eight hours after pollination tube has reached embryo sac. Each male nucleus is surrounded by definite mass of protoplasm. The vegetative nucleus was not detected after the tube had reached embryo sac. Pollen tube invades the synergid through the filiform apparatus, wall of synergid bursts and its contents flows over the lower part of the oosphere. The 2 sperm cells always pass through synergid to egg cell or pole nucleus. The sex nuclei come in contact as resting nuclei and fuse, giving rise to a large nucleus with 2 nucleoli. Triple fusion occurs and the endosperm nucleus contains diploid number of chromosomes. 16 endosperm nuclei are formed before fertilized egg divides. 3 male nuclei were sometimes observed in same embryo sac, 2 fusing with egg nucleus and 1 with polar. This triple fusion in egg nucleus might account for the triploid mutants reported in Oenothera. Sterility of certain hybrids results from slow growth of pollen tube.

Examination of large number of genera indicates that embryo sacs of all genera of Onagraceae are tetranucleate. They are monosporic, but in other families, tetranucleate sacs may be bisporic or tetrasporic in origin. It is pointed out that with rare exceptions plants with tetranucleate or 16-nucleate sacs are herbaceous, and may be regarded as derived types resulting from mutation and variation in the course of phylogenetic development. [See Bot. Absts. 1, Entries 482, 980.]—*Margaret C. Ferguson.*

980. Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 277–317. *1 pl., 14 fig.* 1918. [Abst. by Coulter, J. M., Bot. Gaz. 66: 184. 1918.]—See Bot. Absts. 1, Entries 482, 979.

981. Small, J. **The origin and development of the Compositae.—II. The pollen presentation mechanism.** New Phytol. 16: 198–221. *4 fig.* 1917.—Author distinguishes 14 types of style and 16 of stamens in Compositae, and discusses their phylogenetic significance. [From abst. in Exp. Sta. Rec. 39: 29. 1918.]

982. Weniger, Wanda. **Fertilization in Lilium.** Bot. Gaz. 66: 259–268. *Pl. 11–13.* 1918.—Lilium is again studied, this time from standpoint of cytological phenomena of fertilization. Chromatin of sperm and egg nucleus forms distinct spiremes before nuclear membrane of either nucleus disappears. Spiremes never fuse but segment independently into 12 chromosomes each. These associate in pairs and divide transversely. Of the 48 segments thus formed 24, one half maternal one half paternal, pass to each pole. In triple fusion 3 distinct spiremes are formed. There is no pairing of chromosomes in this division and each splits longitudinally as in ordinary vegetative division.—*Margaret C. Ferguson.*

983. Wolfe, James J. **Alternation and parthenogenesis in Padina.** Jour. Elisha Mitchell Sci. Soc. 34: 78–109. 1918.—The results of numerous experiments are described and also embodied in a series of eleven tables. The experiments cover behavior of tetraspores, fertilized eggs and unfertilized eggs. The former produce only male and female plants in approximately equal numbers; fertilized eggs produce tetrasporic plants only; unfertilized eggs undergo divisions but fail to mature.—*W. C. Coker.*

984. Beekman, H. **Investigations with wood conducted at the forestry experiment station.** Boschbouwk. Tijdschr. Tectona 11: 1–82. *Pl. 1, 10 fig.* 1918.—Includes work on identification of woods of the Dutch East Indies by anatomical structure. [From abst. in Exp. Sta. Rec. 39: 246, 1918.]

985. Brush, W. D. **Distinguishing characters of North American sycamore woods.** Bot. Gaz. 64: 480–496. *7 pl., 3 fig.* 1917.—Wood structure in native North American sycamores. [From abst. in Exp. Sta. Rec. 39: 50. 1918.]

986. Chrysler, M. A. **Anatomy of woody plants.** Bot. Gaz. 65: 363–364. 1918. [Review of: Jeffrey, E. C. The anatomy of woody plants. *p X + 478.* Univ. of Chicago Press, Chicago, 1917.]—Reviewer notes that this book is eminently comparative in its view of the subject; has phylogeny as its keynote; possesses a large number of excellent original illustrations; is clear in its style; contains no bibliography, and emphasizes the "canons of comparative anatomy" (Recapitulation, Conservative Regions and Reversion). He gives brief outline of contents and believes book will be useful to many types of botanists.

987. Flint, Esther M. **Structure of wood in blueberry and huckleberry.** Bot. Gaz. 65: 556–559. *2 pl.* 1918. [Abst. in Exp. Sta. Rec. 39: 243. 1918.] See Bot. Absts. 1, Entry 271.

988. Jaccard, P. **Bois de tension et bois de compression dans les branches dorsiventrales des feuilles. [Tension wood and compression wood in dorsiventral branches.]** Rev. Gén. Bot. 19: 225–242. 1917.—"Wood of tension" on upper side of dorsiventral branches of dicotyledonous trees is produced by tension stimulus (weight of branch or bending due to other causes) acting upon cambium. It differs from "wood of compression" (found on lower side of branches) in more compact and regular grouping of fibers, reduction of vessels, greater development of medullary rays and greater length and smaller lumina of fibers. Data are presented as to microchemical character of torsion fibers, and their occurrence in indigenous trees of France. [From abst. by Crocker, W., Bot. Gaz. 65: 487. 1918.]

989. Record, Samuel J. **Intercellular canals in dicotyledonous woods.** Jour. Forestry 16: 429–441. *8 fig.* 1918.—Attention is called to occurrence of intercellular canals in secondary wood of representatives of 16 families of dicotyledons. These are frequently a normal feature of the wood, but sometimes develop as a result of injury. Vertical canals occur in tangential series or are scattered; radial canals are contained in the medullary rays and vary in number from 1 to 4 in a ray; occurrence in both planes is rare. In origin, canals are schizogenous, lysigenous or schizo-lysigenous. It is pointed out that presence of intercellular canals in a wood is a valuable diagnostic feature. [See Bot. Absts. 1, Entry 260.]—*L. C. Petry.*

990. Thompson, W. P. **Anatomy of Gnetum moluccense.** Bot. Gaz. 65: 119. 1918. [Review of: La Rivière, Henriette C. Sur l'anatomie et l'epaississement des tiges du *Gnetum moluccense* Karst. Ann. Jard. Bot. Buitenzorg 30: 32–58. *Pl. 4–12.* 1916.]—Author describes structure of a single branch of *Gnetum moluccense*, with special reference to accessory steles. Reviewer comments on the "remarkable conclusion" that these originate in nodes and then grow downward, the cambiums appearing at lower and lower levels in inner cortex. No phylogenetic conclusions are reached.

991. Kendall, J. N. **Abscission of flowers and fruits in the Solanaceae with special reference to Nicotiana.** Univ. of California Publ. Bot. 5: 347–428. *6 pl., 10 fig.* 1918. [Abst. by Goodspeed, T. H., Bot. Gaz. 66: 75–76. 1918.]—See Bot. Absts. 1, Entry 272.

992. Kendall, J. N. **Abscission of flowers and fruits in the Solanaceae, with special reference to Nicotiana.** Univ. of California Publ., Bot. 5: 347–428. *6 pl., 10 fig.* 1918. [Abst. in Exp. Sta. Rec. 39: 226. 1918.]—See Bot. Absts. 1, Entry 272.

993. Howard, A. and G. L. C. **The economic significance of the root development of agricultural crops.** Agric. Jour. India, Indian Sci. Cong. No., 17–28. *2* pl., *6 fig.* 1917.—Study of the relation between type of root system and such varietal characters as drought resistance. [From abst. in Exp. Sta. Rec. 39: 230. 1918.]

994. VOROB'EB, S. I. **On the study of the root system of cereal and forage plants.** Selsk Khoz. i Liesov. 251:477–505. 1916. (Abst. in Internat. Inst. Agric. (Rome), Internat. Rev. Sci. and Pract. Agric. 8: 198–201. 1917.)—Study of the length, area of spread, depth of penetration and absorbing ability of the root systems of various plants. [From abst. in Exp. Sta. Rec. 39: 230. 1918.]

995. HAASIS, F. W. **Comparative length of growing season of ring-porous and diffuse-porous woods.** Plant World 20: 354–356. 1917.—Ring-porous species finish their summer growth earlier than diffuse-porous ones. [From abst. in Exp. Sta. Rec. 39: 122. 1918.]

996. WYLIE, ROBERT B. **Cleistogamy in Heteranthera dubia.** Bull. Lab. Nat. Hist. Univ Iowa 7: 48–58. 1917.—*Heteranthera dubia* is a submersed species. Most of the flowers remain under water and are cleistogamous. The few which reach the air are also apparently self fertilized. [From abst. by Coulter, J. M., Bot. Gaz. 65: 197. 1918.]

997. TENOPYR, LILLIAN A. **On the constancy of cell shape in leaves of varying shape.** Bull. Torrey Bot. Club 45: 51–76. *Fig. 1.* 1918. [Abst. in Exp. Sta. Rec. 39: 226. 1918.] —See Bot. Absts. 1, Entry 72.

998. BAILEY, I. W., AND W. W. TUPPER. **Size variation in tracheary cells: I. A comparison between the secondary xylems of vascular cryptogams, gymnosperms and angiosperms.** Proc. Amer. Acad. Arts and Sci. 54: 149–204. *6 fig.* 1918.—A "reconnaissance survey" of the comparative length of the tracheary elements in secondary xylem of trees and shrubs among vascular plants. Measurements were made of length of various types of tracheary cells in 440 species belonging to 124 families. In vascular cryptogams and in older gymnosperms (Cordaitales, Bennettitales, Cycadales) these cells were found to be very long; in conifers, somewhat shorter; and in Gnetales and angiosperms, very much shorter. Exceptions are the vesselless Trochodendraceae and Magnoliaceae, which resemble gymnosperms in possessing very long tracheary elements. Reduction in length of first formed cells of secondary xylem has been associated (phylogenetically) with reduction in amount of primary xylem. Evolution and differentiation of vessels has also resulted in general reduction in length of all tracheary cells. Cell length also varies with age of plant, with vigor and rapidity of growth, and with position of cells with regard to regions where growth adjustments are taking place (wounds, junctions of stems, etc.). There is no absolute correlation between body size and cell size in material studied. Authors summarize literature on cell size and emphasizes need of further investigation along these lines. [See Bot. Absts. 1, Entry 584.]

999. WALDRON, R. A. **The peanut (Arachis hypogaea)—its history, histology, physiology and utility.** Thesis, Univ. of Pennsylvania, May, 1918. *301-338 p., 2 pl., 3 fig.* Philadelphia, Pa., 1918.—Includes work on morphology of peanut plant. Root hairs are present in "rosettes" at base of side roots. Normal "tip" hairs occur only on very young, rapidly growing plants. Hypocotyl tends to become tuberous. Crystal cells are common in epidermis of stem and leaves. Epidermis of carpellary tips is markedly granular, suggesting the presence of a perceptive region here which determines the geotropic reaction of the gynophore. Structure of gynophore and young fruit is described.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

[Unsigned abstracts are by the editor.]

1000. BERRY, EDWARD W. **A Cretaceous Hymenaea from Alabama.** Amer. Jour. Sci. 47: 65–68. *00 fig.* Jan., 1919.—Describes and figures a remarkably well preserved new species, *Hymenaea fayettensis*, from the Upper Cretaceous Tuscaloosa formation of western central Alabama.

1001. Lemoine, Madame Paul. **Contribution a l'étude des Corallinacées.** Bull. Soc. Géol. France. iv, 17: 233–283, *23 fig.* (1917) 1918.—A comprehensive paper comprising four distinct contributions to the knowledge of the fossil Corallinaceae. Part 1—Généralités sur la structure des Corallinacées (pp. 233–240) discusses the morphology of the known forms. Part 2—Etat actuel de nos connaissances sur les Corallinacées fossiles (pp. 240–256) is an extremely valuable summary of the existing state of knowledge, listing all of the known fossil forms with their geologic and geographic occurrences. The list will surprise students of recent forms since it includes a large number of types, some present in ages as remote as the Cambrian, and serving to emphasize the importance of these algae in reef building. A complete bibliography is appended to this part. Part 3—Corallinacées fossiles de la Martinique (pp. 256–279, t. f. 1–23) is devoted to the description and figuring of new species all of which are probably of lower Miocene (Aquitanian) age, although some were contained in rocks ejected during the eruption of Mont Pelée and therefore of uncertain age. The species all of which are new, comprise 4 of Lithothamnium (*peleense, caravellense, Douvillei, Lacroixi*), 6 of Lithophyllum (*Giraudi, premoluccense, martinicense, preprototypum, prelichenoides Dublancqui*), one each of Corallina (*Cossmanni*), Arthrocardia (*Mangini*) and Amphiroa (*prefragilissima*). Some of these are very satisfactory, showing conceptacles with spores. Part 4—(pp. 280–283) records the occurrence of *Lithophyllum amphiroaeformis*, described originally by Rothpletz from the Upper Cretaceous (Turonian) of France (Var.), in the late Lower Cretaceous (Albian) of Landes, France.

1002. Lundqvist, T. **Variationstypen von Baiera minuta Nathorst.** Geol. Fören. Förhandl. 40^5: p. 491–502. *9 text fig., 9 pl.* 1918.—Discusses the variations in leaf form of *Ginkgo minuta* Nathorst, as shown by a series of well preserved specimens from the *Lepidopteris ottonis zone* of the Rhaetian or late Triassic coal deposits of Bjuf in Sweden. The author regards these forms as referable to the extinct genus Baiera instead of to Ginkgo and shows that they vary through almost as wide limits as do the leaves of the existing *Ginkgo biloba*, some of the variants of the latter suggesting this ancient fossil species. *Baiera minuta* in its larger forns has deeply divided non petiolate leaves resembling closely the typical and wide-ranging late Triassic species *Baiera muensteriana* (Presl.) Heer, while other and smaller leaves show fewer divisions and an incipient petiole suggesting these features of various Jurassic species of Ginkgo and some of the variants of the still existing species.

1003. Ramsay, W. **Växtförande aflagringar och det postglaciala hafvets gräns i Liljendals socken, Nylands län.** Geol. Fören. Förhandl. 40^5: 529–534. 1918.—Describes the late Quaternary or post-glacial deposits of Liljendal which are situated about 75 km. northeast of Helsingfors in district of Nyland, Finland. Two horizons contain fossil plants. The older of these is correlated with the time during which the Baltic region was shut off from the ocean and known as the Ancylus Lake, the climate being dryer and warmer than at present. The younger horizon is correlated with that part of the post-glacial when the Baltic had re-established its connection with the Atlantic and is known as the Litorina sea, at which time the climate appears to have been much warmer than at the present time. The Ancylus flora as represented at Liljendal comprises 28 species including Pinus, Picea, Alnus, Betula, Rhamnus, Populus, Robus, Nuphar, Potamogeton, Phragmites, Scirpus, Carex, and numerous diatoms. The Litorina flora contains Pinus, Alnus, Betula, Tilia, Phragmites and diatoms.

PATHOLOGY

Donald Reddick, *Editor*

[Unsigned abstracts are by the editor.

1004. Allard, H. A. **Effects of various salts, acids, germicides, etc., upon the infectivity of the virus causing the mosaic disease of tobacco.** Jour. Agric. Res. 13: 619–637. 1918.—The writer treats the virus solution (juice from diseased plants) with a solution of the compound

under investigation. The concentration of the various compounds are, wherever possible, given as grams of water-free reagent in cubic centimeters of virus solution. The effect of the reagent on the virus was determined by inoculating healthy tobacco plants with the mixture and observing the effect. The concentrations of nitric and hydrochloric acid necessary to affect the infectivity of the virus solution was 1 gram in 50 to 100 cc.; for phosphoric, citric and acetic, 1 gram in 20 to 50 cc. The ability to infect tobacco plants was not destroyed when the virus was treated with 1 gram in 100 cc. of aluminum sulphate, silver nitrate or mercuric chloride; 1 gram in 200 cc. of lead nitrate; 1 gram in 50 cc. of lithium nitrate, sodium carbonate or sodium nitrate; and 1 gram in 12.5 cc. of manganese sulphate. These were highest concentrations of these salts used. It required about 1 gram of sodium hydroxid to 2000 cc. of virus solution, 1 gram to 500 cc. of copper sulphate, 1 gram to 100 cc. of zinc chloride, and 1 gram to 100 cc. of potassium permanagante to produce any noticeable effect. Carbolic acid "creolin," cresol and "Phenaco" affected the infectivity of the virus but little. Chloral hydrate, naphthalene crystals, camphor and thymol had no appreciable effect. Glycerine, sodium benzoate, quinine bisulphate, tannic acid, sodium taurocholate, and saponin affected the infectivity of the virus in rather high concentrations. The virus could be preserved in 45 per cent ethyl alcohol for 21 days or 40 per cent acetone for 77 days without destroying the infective principle. Higher concentrations of these two substances affected it. Four per cent. formaldehyde quickly destroyed its infectious properties as did mixing it with talc, kaolin or soil for a period.—*Lon A. Hawkins.*

1005. Allen, F. W. **Picking the apple for flavor and keeping quality.** Proc. Washington State Hort. Assoc. 14: 106–110. 1918.—The apple troubles considered are ordinary and soft scald and Jonathan spot. Premature picking increased the amount of scald, and late picking increased the amount of Jonathan spot.—*F. D. Heald.*

1006. Brown, H. B., and C. T. Ames. **Cotton experiments, 1917.** Mississippi Agric. Exp. Sta. Bull. 184: 1–27. Feb., 1918.—Includes a test of varieties of cotton more or less resistant to the wilt disease caused by *Fusarium vasinfectum.* Gives the percentage of wilt and the money value of the cotton produced. A variety showing high resistance to the wilt is not always the best yielding variety under boll weevil conditions.—*C. W. Edgerton.*

1007. Edgerton, C. W. **Delayed ripening of tomatoes caused by spraying with Bordeaux mixture.** Louisiana Agric. Exp. Sta. Bull. 164: 1-16. *Fig. 1-4.* Sept., 1918.—While Bordeaux mixture will check the leaf diseases caused by *Alternaria solani* and *Cladosporium fulvum,* it also causes a delayed ripening of the fruit and does not always result in a greater yield. Results of three years tests show that the delay in ripening caused by spraying may be as much as one to two weeks. Spraying is advocated only to check serious epiphytotics.—*C. W. E.*

1008. Fisher, D. F. **The abuse of water on fruit and trees.** Proc. Washington State Hort. Assoc. 14: 19–27. 1918. A discussion of chronic drouth as affecting growth of apple trees and the size of fruit; sudden and acute drouth as the cause of spot necrosis or drouth spot; drouth in late July and August as the cause of "punk;" the relation of soil type and shortage of water supply to cork. Results of irrigation experiments on bitter pit are given showing an increase with heavy or over-irrigation and a reduction with heavy irrigation followed by light applications. The claim is made without the presentation of experimental evidence, that "collar rot" in the Northwest is not the result of the abuse of irrigation water (winter injury), but is generally caused by the bacteria of fire blight.—*F. D. Heald.*

1009. Fromme, F. D., and W. J. Schoene. **Dusting and spraying fos apple scab and codling moth.** Rept. Virginia State Entomologist and Plant Pathologist 1916-17: 22-26. 1918.—A dusting mixture of sulfur, hydrated lime, and arsenate of lead gave satisfactory control of apple scab under conditions of moderate infection but was not as efficient as liquid applications of lime-sulfur solution under conditions of heavy scab infection. Considerable burning of fruit and foliage resulted from the arsenate of lead in both dust and liquid mixtures.—*Fromme.*

1010. Gaines, E. F. **Comparative smut resistance of Washington wheats.** Proc. Washington State Grain Growers, Shippers and Millers Assoc. 12: 21–25. 1918.—Of ten varieties tested Turkey was the most resistant and the club hybrids the most susceptible. Hybrid 128, one of the most susceptible of the club wheats, gave however the highest acre value under field conditions.—*F. D. Heald.*

1011. Gardner, V. R. **Pollination of sweet cherries.** Proc. Washington State Hort. Assoc. 14: 72–77. 1918.—Mainly a discussion of improper pollination as a cause of sterility or the failure to set fruit.—*F. D. Heald.*

1012. Heald, F. D. **The most effective method of controlling smut.** Proc. Washington State Grain Growers, Shippers and Millers Assoc. 12: 26–34. *Fig. 1.* 1918—Reports of the occurrence of large numbers of spores of *Tilletia tritici* on grain threshed from apparently smut-free fields; the ineffectiveness of seed treatment for fall plantings due to soil infestation from wind-blown spores; a summary of the results on the "smut shower" for the seasons of 1915 and 1916. A discussion follows on the relation of time of planting to the percentage of smut. Carefully treated winter wheat shows varying amounts depending upon the seeding time, ranging from none to 5 per cent, in August plantings to a maximum of 30 to 40 per cent., in early October, followed by a decline through the later seedings. The early seedings were not only nearly smut-free but survived the winter much better than the late seedings. A summary of the cooperative work on the use of smut exhaust fans on threshing machines is reported.—*F. D. Heald.*

1013. Heald, F. D. **Diseases of the potato.** Proc. Washington State Hort. Assoc. 14: 115–124. 1918.—Popular presentation of losses from potato diseases, their cause and their prevention or control by rogueing, seed selection, proper handling and storage, spraying, seed disinfection and soil management.—*F. D. Heald.*

1014. Jones, L. R. **Disease resistance in cabbage.** Proc. Nation. Acad. Sci. 4: 42–46. 1918.—See Bot. Absts. 1, Entries 321, 903.

1015. Mackie, W. W. **A possible new fungicide for wheat and barley smut.** Science 48: 515–516. 1918.—Preliminary seed-treatment tests with lime-sulfur solution for the control of stinking smut of wheat and covered smut of barley have given promising results. In comparison with the bluestone-lime dip now commonly used on the Pacific coast, the lime-sulfur dip is said to be cheaper and easier of application in that it involves single instead of double dipping. It produces no noticeable deleterious effects on germination and fully protects seed sown in smut-infested soil.—*V. F. Tapke.*

1016. MacMillan, H. G. **An epidemic of corn smut following hail.** Phytopath. 8: 584–585. 1918.—Two weeks after severe hail storm 19 per cent. of stalks of maize showed uniformly small smut boils (Ustilago zeae). Outside the hail area 1 per cent. infection was found. Lesions occurred only at leaf axils, never at bruises. It is thought that hail may have broken open the boils and have allowed for the distribution of an unusually large number of spores.

1017. McClintock, J. A., and L. B. Smith. **True nature of spinach blight and relation of insects to its transmission.** Jour. Agric. Res. 14: 1–60. 1918.—Results of a study of spinach blight in eastern Virginia. Estimated loss from disease is $200,000 to $400,000 yearly. Disease is characterized by a yellow mottling of the leaves which are small, malformed and become brown and die in the later stages. The disease can be transmitted by inoculating healthy plants with juice from diseased individuals. Infection is spread by aphids. Two species, *Macrosiphum solanifolii* and *Rhopalosiphum persicae* are commonly found on spinach in that region and both act as carriers. M. *solanifolii* is apparently more important in spreading

the disease.—Non-virus bearing aphids must feed on diseased plants from two minutes to fourteen hours before they become a carrier. Virus bearing aphids produced infection in healthy plants when allowed to feed on them for two minutes. Infection may be carried to several healthy plants by one aphid. Virus bearing aphids do not lose ability to transmit the disease during moulting, and infections were obtained from the offsprings of virus bearing aphids which had not previously partaken of food.—Control of aphids infesting spinach offers most immediate possibility for control of the disease.—*Lon A. Hawkins.*

1018. MELCHERS, LEO E. **Potato seed diseases and their treatment.** Kansas Agric. Exp. Sta. Circ. 63. 1918.

1019. MELCHERS, LEO E. **The mosaic or white pickle disease of cucumbers.** Trans. Kansas State Hort. Soc. 34: 102–104. 1918.—A description of white pickle and its symptoms as occurring in greenhouses in Wichita, Kansas. The disease ruined about 20 per cent. of the crop. Sanitary measures advocated.—*L. E. Melchers.*

1020. MELCHERS, LEO E., AND JOHN H. PARKER. **Another strain of Puccinia graminis.** Kansas Agric. Exp. Sta. Circ. 68. May, 1918.—A biologic form of stem rust of wheat which has been given the name *Puccinia graminis tritici-inficiens* has been reported as occurring in Kansas and Minnesota. It is physiologically distinct from *Puccinia graminis tritici*, in that it attacks three differential wheats: Kanred, P1066 and P1068, which recently were published by the authors as showing marked resistance to *Puccinia graminis tritici*. It is likewise physiologically distinct from *Puccinia graminis tritici-compacti*, in that it vigorously attacks Haynes Blue Stem (Minn. 169), which is known to be non-congenial to *Puccinia graminis tritici-compacti.*—*L. E. Melchers.*

1021. NEAL, DAVID C. **Sweet potato stem-rot or wilt.** Louisiana State Univ. Extens. Circ. 28: 1–4. Oct. 1918.—Describes the stem-rot of sweet potato caused by Fusarium and gives methods of control, including seed selection, seed-bed sanitation and crop rotation. Home selection of seed is preferable to buying seed from other localities.—*C. W. Edgerton.*

1022. OSNER, GEORGE A. **Additions to the list of plant diseases of economic importance in Indiana, II.** Proc. Indiana Acad. Sci. 1917: 145–147. 1918.—The author lists 24 diseases on 17 hosts which have not previously been recorded for the state. (Supplementary to article by same author. Proc. Ind. Acad. Sci. 1916: 327–332. 1918.)—*H. S. Jackson.*

1023. PELTIER, GEO. L. **Susceptibility and resistance to citrus-canker of the wild relatives, citrus fruits and hybrids of the genus Citrus.** Jour. Agric. Res. 14: 337–358. Aug., 1918.—See Bot. Absts. 1, Entry 924.

1024. REED, GEORGE M. **Physiological specialization of parasitic fungi.** Mem. Brooklyn Bot. Gard. 1: 348–409. 1918.—Critical review of the literature, mostly Uredine and Erysiphaceous, including that of bridging hosts. Bibliography of 174 titles.

1025. ROBBINS, W. W., AND G. E. EGGINGTON. **Alfalfa dodder in Colorado.** Colorado Agric. Exp. Sta. Bull. 248: 1–15. 1918.—Popular bulletin giving information on the prevalence of dodder in Colorado, general appearance of the parasite in the field, its life history, how it is spread, kinds of dodder infesting alfalfa in Colorado, methods of eradication, and methods of cleaning alfalfa seed to free it from dodder seed.—*W. W. Robins.*

1026. ROSEN, H. H. **Notes on some methods and terms employed in studying the Uredinales.** Phytopath. 8: 581–583. 1918.

1027. ROSENBAUM, J. **The origin and spread of tomato fruit rots in transit.** Phytopath. 8: 572–580. *fig. 1, pl. 4.* 1918.—A study of various tomato fruit rots occurring on winter-grown southern tomatoes, their origin and ability to spread in transit.—With the possible exception of Phoma rot and leak (*Rhizopus* sp.) the tomato fruit rots originate in the field

and spread in transit from infected fruit included in the pack. Based on their ability to spread in transit from infected fruit, the tomato fruit rots are divided as follows: (1) those rots in which the causal fungus can spread and infect an adjacent uninjured fruit (*Phytophthora terrestria*); (2) those in which the causal organism can spread but infects fruit only through the stem end or through some break in the skin of the tomato (*Rhizoctonia* sp., *Sclerotium rolfsii, Rhizopus* sp.); (3) those in which the causal fungus is unable to grow through the tomato wrappers and infect healthy adjacent fruit (*Macrosporium solani, Phoma destructiva, Colletotrichum phomoides*).—*J. Rosenbaum.*

1028. SACKETT, WALTER G. **Bacterial disease of the Wragg cherry.** *In* Report of the Bacteriologist. Colorado Agric. Exp. Sta. Ann. Rept. 30: 20–21. 1918.—Lime-sulfur solution, self-boiled lime-sulfur and bordeaux mixture seemed to reduce the amount of disease but there was a mild case of spot and the bactericides used seemed to dwarf the fruit.

1029. SMITH, LOREN B. **Spinach blight and its transmission by insects.** Rept. Virginia State Entomologist and Plant Pathologist 1916–17: 40–58. *Fig. 1–6.* 1918.—Review of a previous paper by McClintock and the author (Jour. Agr. Res. 14: 1–59. 1918) showing the disease in question to be infectious, of unknown causation, and transmissible by aphids.—*F. D. Fromme.*

1030. TOBLER, F. **Ein neues tropisches Phyllosiphon, seine Lebensweise und Entwicklung.** Jahrb. wiss. Bot. 58: 1–28. *Pl. 1, fig. 1–11.* 1917.—See Bot. Absts. 1, Entry 1050.

1031. VANDER BIJL, P. A. **Fomes applanatus (Pers) Wallr. in South Africa, and its effect on the wood of the black ironwood trees (Olea laurifolia).** South African Jour. Sci. 14: 485. 1918.—The fungus is the main cause of the death and blowing over of large numbers of *Olea laurifolia* (black ironwood) trees in the Eastern Cape Conservancy; it is regarded as a wound parasite, and its effect on the wood is described.—*E. M. Doidge.*

1032. VASEY, H. E. **Millet smuts and their control.** Colorado Agric. Exp. Sta. Bull. 242: 1–22. 1918.—Smut is the chief disease affecting millets in the Great Plains states. Plants were infected by inoculating the seeds. Spores of both *Ustilago crameri* and *U. panici-miliacei* subjected to formaldehyde gas for a 4, 6 and 12 hours failed to germinate. Millet smut spores retain their viability at least three years. Spore dissemination in the field is effected to some extent by a beetle (*Phalacrus politus*). A solution of 1 pint of formaldehyde in 40 to 45 gallons of water is found effective in treatment.—*W. W. Robbins.*

1033. WORTLEY, E. J. **Potato leaf-roll: its diagnosis and cause.** Phytopath. 8: 507–529. *Fig. 1–16.* 1918.—Leaf-roll has caused from a half to a total loss of the potato crop on some farms in Bermuda. The lower leaves only are important in diagnosing the disease. The symptoms appear five to eight weeks after planting. The progeny of potatoes grown under unfavorable conditions showed largely increased percentages of leaf-roll, i.e. in drought conditions as compared with shade, in Bermuda as compared with Maine. No notable increase in leaf-roll was noted in the first crop in Bermuda from healthy seed in contrast to such cases reported by Quanjer and attributed to soil infection.—*F. M. Blodgett.*

1034. ZINSSMEISTER, C. L. **Ramularia root-rots of ginseng.** Phytopath. 8: 557–571. *Fig. 1–8.* 1918.—The symptoms, history, distribution, and economic importance of a root disease of ginseng, *Panax quinquefolium,* to which the popular name rust has been given, are discussed.—Isolations made from material received from two widely separated states, New York and Wisconsin, yielded in the majority of cases, species of Ramularia. Cultural and morphological studies of the Ramularias obtained show that there are two distinct species, which are designated *Ramularia destructans* and *Ramularia panacicola.* Proof of the pathogenicity of these two species is furnished as well as evidence that the disease spreads during the dormant season. Descriptions of the two species are appended. [See Bot. Absts. 1, Entry 791.]—*J. Rosenbaum.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

1035. VALDIGUIÉ, M. **Saffron of Kosani.** Extrait du Bulletin Commerce Macédoine. [Through J. Pharm. et Chim. VII, 18: 183. 1918.] The saffron grows wild in Asia minor, in Persia and also in Greece, where it is especially cultivated in the region of Kosani, south and south west of Macedonia on a large plain, 700 meters high, where the temperature never is lower than 5°C. General descriptive data of the plants and the flowers are given and the statement is made that the material resembles French saffron closely and that it is largely exported to France and sold there as French (Gâtinais) saffron.—*Arno Viehoever.*

1036. VAN ITALLIE, L., AND H. J. LEMKES. **Analysis of Styrax.** Pharm. Weekblad 55: 141–149. [Through J. Pharm. et Chim. VII, 18: 181. 1918.]—The origin, main characteristics of Styrax and important analytical data are discussed, including especially the procedure for the quantitative determination of cinnamic acid. The amount of this acid present in 9 samples varied from 0 to 35.2 per cent. The saponification number does not indicate the amount of cinnamic acid present. Heated on the steambath, styrax should not develop any odor of oil of turpentine,—*Arno Viehoever.*

1037. VAN ITALLIE, L. **Chemical composition of Empetrum nigrum.** Pharm. Weekbl. 55: 709–718. [Through J. Pharm. et Chim. VII, 18: 180. 1918.] The leaves contain a wax (largely a ceryl compound), benzoic acid, tannin, fructose, urson and probably rutin. Urson in its anhydric form has the formula $C_{18}H_{16}O$ and is identical with the urson found in the leaves of the "Red Bear Berry" (Uva ursi) and other Ericaeae. Empetrum nigrum contains no alkaloids nor andromedotoxin or glucosides decomposed by emulsin. The presence of benzoic acid and urson, both found in several ericaceae, makes it probable that the empetraceae belong to the ericaceae, a suggestion already previously expressed by M. Hallier on the basis of their external and internal structure.—*Arno Viehoever.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

MOSSES

1038. DIXON, H. N. **Swartzia montana Lindb. in Surrey.** Jour. Bot. 56: 155–156. 1918 —A note of an isolated new station for this moss.—*A. Le Roy Andrews.*

1039. DIXON, H. N. **Hypnum falcatum (Brid.) var. nov. delicatulum Dixon.** Jour. Bot. 56: 360. 1918.—A variant form from Dartmoor, England, collected by Mr. G. T. Harris is described under the above varietal name.—*A. Le Roy Andrews.*

1040. HESSELBO, AUG. **The Bryophyta of Iceland.** In: ROSENVINGE & WARMING. The botany of Iceland 1: 395–677. 1918.—On the basis of material gathered by himself and what was available of earlier collections the author lists 93 species of hepatics, 20 of *Sphagnum* and 324 (with 2 subspecies 326) of true mosses, including two new species of *Bryum* and one of *Brachythecium.* Under each species are included notes on distribution and habitat, and at the close the general ecological aspects are discussed, particularly as to the bryophytic vegetation about the various hot springs. The work is illustrated by a number of photographs.—*A. Le Roy Andrews.*

1041. HURST, C. P. **Philonotis caespitosa var. adpressa Dismier in Britain.** Jour. Bot. 56: 250. 1918.—A note of the occurrence of this variety near Burridge Heath, Great Bedwyn, South Wiltshire.—*A. LeRoy Andrews.*

1042. Luisier, A. **Fragments de bryologie ibérique.** Broteria 16: 123–142. 1918.—After a brief outline of previous publications, the author gives a list of all species of mosses thus far reported from the ancient province of Galicia, Spain, followed by a more detailed list of those species which are additions to the published flora. Critical notes accompany many of the species in the latter list, and a new variety each of *Fissidens* and of *Pohlia* is described.—*E. B. Chamberlain.*

1043. Machado, Antonio. **Apontamentos briológicos.** Broteria 16: 97–103. 1918.—The author gives critical notes, and cites localities for twenty species of mosses and four of hepatics which are either new or rare in the Portuguese flora. A new variety of *Fissidens* and one of *Rhynchostegium* are described.—*E. B. Chamberlain.*

1044. Potier de la Varde, R. **Sur trois mousses inédites de la Chine orientale.** Rev. Gén. Bot. 30: 346–354. 1918.—From the herbarium of the late Gen. Paris a collection of mosses made by R. P. Courtois in China in 1910 is listed. It comprises 22 species, 3 being described and figured as new, one each in *Macromitrium*, *Pylaisia*, and *Gollania.*—*A. Le Roy Andrews.*

1045. Wheldon, J. A. **Drepanocladus aduncus (Hedw.) var. Wheldoni Ren. in N. Somerset.** Jour. Bot. 56: 273. 1918.—This variety was found by Mr. C. P. Hurst on the Burnham sandhills, opposite Berrow Church.—*A. Le Roy Andrews.*

LIVERWORTS

1046. Campbell, D. H. **Studies on some East Indian Hepaticae.** Ann. Bot. 32: 319–338. *Pl. 8–9, fig. 1–10.* 1918.

1047. Douin, Ch. and R. **Le Reboulia Raddi.** Rev. Gén. Bot. 30: 129–145. *Fig. 1–15.* 1918.—According to most recent students of the Hepaticae the genus *Reboulia* is composed of a single variable and widely distributed species, *R. hemisphaerica* (L.) Raddi. The authors, on the basis of careful cultures, express the opinion that this species is an aggregate and separate from it, as new species, *R. occidentalis* of western Europe and *R. Charrieri* of the Mediterranean region. The specific characters relied upon are derived especially from the size and surface-markings of the spores, the form of the female receptacle, and the position of the male receptacle, which in all three species is in the form of a sessile disc. This disc is originally median and retains this position in *R. hemisphaerica*; in the other two species it becomes split into two by the subsequent growth of the male branch, the halves becoming displaced laterally and appearing marginal. In comparing the female receptacles of *Reboulia* with those of other genera of the Marchantiaceae the authors split off the new genus *Marchantiopsis* for the reception of *Marchantia geminata*, *M. Treubii*, etc. In the new genus the groups of archegonia are situated underneath the lobes, and the receptacles do not develop the conspicuous sterile rays between the groups, which constitute so striking a feature in *M. polymorpha* and the other typical species of *Marchantia.*—*A. W. Evans.*

1048. Hesselbo, Aug. **The Bryophyta of Iceland.** In: Rosenvinge & Warming. The botany of Iceland 1: 395–677. 1918.—See Bot. Absts. 1, Entry 1040.

1049. Machado, António. **Apontamentos briologicos.** Broteria 16: 97–103. 1918.—See Bot. Absts. 1, Entry 1043.

ALGAE

1050. Tobler, F. **Ein neues tropisches Phyllosiphon, seine Lebensweise und Entwicklung.** Jahrb. f. wiss. Bot. 58: 1–28. *Pl. 1, fig. 1–11.* 1917.—*Phyllosiphon asteriforme* is described as a new parasitic and endophytic siphonaceous alga on the leaves of *Zamioculcas zamiifoliae* Lodd. in German East Africa. The alga, while chlorophyll bearing, is strictly parasitic and causes in most cases a marked gall formation. Affinities of the new organism with other Phyllosiphonaceae are discussed.

1051. Wolfe, James J. **Alternation and parthenogenesis in Padina.** Jour. Elisha Mitchell Sci. Soc. 34: 78–109. 1918.—See Bot. Absts. 1, Entry 983.

FUNGI

1052. Blagaic-Zagreb, K. **Boletus conglobatus, eine neue Species.** Hedwigia 60: 10–11. 1918.—The species is described from Croatia.

1053. Henderson, M. P. **The black-leg disease of cabbage caused by Phoma lingam (Tode) Desmaz.** Phytopath. 8: 379–431. *Fig. 1–10.* 1918.—The data presented indicate that *Phoma siliquastrum* Desmaz., *Aposphaeria brassicae* Thüm., *Phoma oleracea* Sacc., *Phoma brassicae* Thüm, and probably also *Phoma napobrassicae* Rostr. are merely other names applied to this same fungus as it occurred under varying conditions. The fungus occurring on *Melilotus alba* and designated as *Phoma oleracea* Sacc. does not produce infection when inoculated into cabbage, and should be otherwise designated. Inoculations show that at least twenty-two members of the Cruciferae are hosts of *Phoma lingam.* [See Bot. Absts. 1, Entry 316.]—*H. M. Fitzpatrick.*

1054. Kulkarni, G. S. **Smuts of jowar (sorghum) in the Bombay Presidency.** Bull. Agric. Res. Inst. Pusa 78: 1–26. *Pl. 1–6.* 1918.—Four species are listed as occurring on sorghum, one of them reported for the first time from India.

1055. Lloyd, C. G. **Mycological notes, no. 53.** *P. 750–764.* Feb., 1918. [Cincinnati, Ohio.]—*Polyporus rusticus* received from S. Africa described as new. *Stropharia tuberosa* n. sp., described here by H. C. Beardslee, arises from a black sclerotium. Photographs and notes on "rare or interesting fungi received from correspondents" include the following: *Hydnum fimbriatum, Clathrus camerunensis, Polyporus rheades, Sebacina amesii, Catastoma ater, Isaria byssoidea, Tremella marmorata, Polystictus cryptomeniae, Polyporus vanderystii, Trametes ungulata, Scleroderma columnare, Polystictus stereoides, Cantharellus clavatus, Lenzites subferruginea, Polyporus grantii, Stereum liratum, Cyttaria gunnii, Lysurus sinensis, Polystictus cuneatus.*—*H. M. Fitzpatrick.*

1056. Pascher, Adolf. **Asterocystis de Wildeman und Asterocystis Gobi.** Beih. Bot. Centralbl. 35^2: 578–579. 1917.—The name *Asterocystis* was given by Gobi in 1879 to an alga with affinities apparently with the Glaucophyceae. The same name was used by de Wildeman in 1893 for a member of the Olpidiaceae. The author suggests that the name in the sense of de Wildeman be dropped and proposes the generic name *Olpidiaster* instead. *Olpidiaster radicis* Pascher (*Asterocystis radicis* de Wildeman) therefore appears as a new name.

1057. Zeller, S. M. **Fungi found on Codium mucronatum.** Pub. Puget Sound Biol. Sta. 2: 121–125. *Pl. 20.* 1918.—Three new species of marine fungi are described from Friday Harbor, State of Washington. Of these *Chytridium codicola* and *Rhizophidium codicola* are Phycomycetes belonging to the family Chytridiaceae, and *Stemphylium Codii* is a Hyphomycete belonging to the family Dematiaceae.—*T. C. Frye.*

LICHENS

1058. Burnham, S. H. **Lichens of the Berkshire Hills, Massachusetts.** Bryologist 21: 29–32. 1918.—The author lists 55 species and varieties from Mt. Greylock, and 22 from other parts of the Berkshires.—*L. W. Riddle.*

1059. Durfee, T. **Lichens of the Mt. Monadnock region, N. H. X.**—Bryologist 21: 18. 1918.

1060. Fink, B. **A new genus and species of the Collemaceae.** Mycologia 10: 235–238. *Pl. 13.* 1918.—The author describes *Collemodes*, new genus, with *C. Bachmanianum*, new species, as the type, to be distinguished from *Collema pulposum* (Bern.) Ach. by differences in the sexual reproductive organs.—*L. W. Riddle.*

1061. RIDDLE, L. W. **Report on the lichens of St. Thomas and St. John.** In: N. L. Britton, The flora of the American Virgin Islands. Mem. Brooklyn Bot. Gard. 1: 109—115. *3 fig.* 1918.—Seventy species are listed, with one new species each in the genera *Opegrapha, Lecania,* and *Blastenia*; a new variety of *Leptogium marginellum* (Sw.) Mont.; and new combinations of *Caloplaca, Buellia,* and *Graphina.* [See Bot. Absts. 1, Entry 1077.]—*L. W. Riddle.*

1062. RIDDLE, L. W. **[Chapter on the Lichens.]** In: N. L. Britton, The flora of Bermuda. *Pp. 470-479.* Scribner, New York, 1918.

1063. RIDDLE, L. W. **Some extensions of ranges.** Bryologist 21: 50. 1918.—New stations are recorded for four interesting species of lichens, one, *Dirina repanda* (Fr.) Nyl., being new to North America.—*L. W. Riddle.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

Unsigned abstracts are by the editor.]

1064. ASHE, W. W. **Notes on Betula.** Rhodora 20: 63-64. 1918. *Betula lenta* var. *uber,* a new variety, is described from Virginia.

1065. ASHE, W. W. **Notes on southern woody plants.** Torreya 18: 71-74. 1918.—*Vaccinium Margarettae* Ashe is described as a new species from Georgia and South Carolina. New combinations are made in *Quercus* and in *Carya.*

1066. BAKER, EDMUND G. **The Sumatran species of Saurauja.** Jour. Bot. 56: 161-167. 1918.—The author recognizes twenty-five species of this genus from Sumatra, and of this number six species and two varieties are new to science.

1067. BATES, J. M. **A new Kochia.** Amer. Bot. 24: 51, 52. 1918.—The author characterizes a new species of *Kochia* (*K. alata*) from Nebraska.

1068. BICKNELL, E. P. **The ferns and flowering plants of Nantucket. XIX.** Bull. Torr. Bot. Club 45: 365-383. 1918.—This article contains supplementary notes on several species previously mentioned in the series; *Quercus prinoides* var. *rufescens* Rehder is raised to specific rank.

1069. BLAKE, S. F. **On the names of some species of Viburnum.** Rhodora 20: 11-15. 1918.—Blake finds that the plant known for many years as *Viburnum pubescens* auth,. not Pursh, should take the name *Viburnum affine* Bush of which he recognizes two varieties namely, var. *affine* (typical form) and var. *hypomalacum* (a new variety). Two new combinations are recorded under *Viburnum pubescens* (Ait.) Pursh namely, *V. pubescens* (Ait.) Pursh var. *Canbyi* (Rehder) Blake, and *V. pubescens* (Ait.) Pursh var. *longifolium* (Dippel) Blake.

1070. BLAKE, S. F. **Lycopodium sabinaefolium var. sharonense.** Rhodora 20: 60. 1918. —Record is made of a new combination namely, *Lycopodium sabinaefolium* Willd. var. *sharonense* Blake.

1071. BLAKE, SIDNEY. **Notes on the Clayton herbarium.** Rhodora 20: 21-28, 48-54, 65-73. *Figs. 1-8.* 1918.—From studies made of specimens in the Clayton herbarium, now at the British Museum, the author has found it necessary to make several nomenclatorial changes of American flowering plants. These changes concern the following genera: *Eleocharis, Fimbristylis, Rynchospora, Dioscorea, Helianthemum, Oenothera, Thaspium, Gratiola, Agalinis,* and *Gnaphalium.*

1072. Blake, S. F. **A variety of Smilax glauca.** Rhodora 20: 78–80. 1918.—The author lescribes two varieties of *Smilax glauca* Walt. namely, var. *genuina* and var. *leurophylla*.

1073. Blake, S. F. **Note on the proper name for the Sassafras.** Rhodora 20: 98–99. 918.—Blake finds that the correct name for this well known plant is *Sassafras officinale* Nees & Eberm. The nearly glabrous and more or less glaucous form of this species is desig-ıated as var. *albidum* (Nutt.) Blake.

1074. Blake, S. F. **Notes on the flora of New Brunswick.** Rhodora 20: 101–107. 1918.—The author records a list of the plants collected in 1913 on the coastal sands of New Brunswick ınd adjacent small islands. A new hybrid is described as *Juncus alpinus* var. *insignis* × *revicaudatus* Blake.

1075. Britton, N. L. **An undescribed Scirpus from California.** Torreya 18: 36. *Fig. 1.* 918.—*Scirpus Congdoni* Britton is described and illustrated as a new species.

1076. Britton, N. L. **The relatives of Catalpa trees in the West Indies.** Jour. New York Bot. Gard. 19: 6–9. *Pl. 209.* 1918.—Author discusses a small group of trees or shrubs of the West Indies, which have been known hitherto either under the name of *Catalpa* or *Bignonia*. For these relatives of the typical *Catalpa* he has raised the sectional name *Macrocatalpa* of Grisebach to generic rank and includes three species namely, *M. longissima*, *M. punctata*, and *M. purpurea*.

1077. Britton, N. L. **The flora of the American Virgin Islands.** Brooklyn Bot. Gard. Mem. 1: 19–118. 1918. [Contrib. N. Y. Bot. Gard. No. 203.]—The present flora concerns primarily the islands of St. Thomas, St. Jan, and St. Croix. The number of species recorded for these islands, exclusive of the fungi and algae, is 1052, which are distributed among the following groups: spermatophytes 890, pteridophytes 41, bryophytes 46, and lichenes 75. The following new species and varieties are described: *Opuntia antillana* Britton & Rose, *Opegrapha acicularis* Riddle, *Lecania euthallina* Riddle, *Blastenia nigrocincta*, and *Leptogium marginellum* var. *isidiosellum* Riddle. Several new combinations are also included. [See Bot. Absts. 1, Entry 1061.]

1078. Burkill, I. H. **A new Dendrobium, D. gracilipes, from the Rhio Archipelago.** Jour. Straits Branch R. A. Soc. No. 79: 45–46. 1918.—*Dendrobium* (*Sarcopodium*) *gracilipes* is described and figured.

1079. Burkill, I. H. **Begonia Haniffii, a small tuberous species of the Islands of Lankawi.** Jour. Straits Branch R. A. Soc. No. 79: 103–104. 1918. *Begonia Haniffii*, a new species, is described and figured.

1080. Cañizares, Felipe Garcia. **El Jardin Botanico del Instituto de segunda Enseñanza de la Habana.** *Roy. 8vo, 169 p., pl. I–VI* (garden plans). Havana, 1918.—The author gives a historical account of the Botanical Garden in Havana, followed by a catalogue of the indigenous and exotic plants growing in the Garden. Both scientific and common names of plants are listed, and several species are illustrated by photographic reproductions.

1081. Cockerell, T. D. A. **A new hybrid sunflower.** Torreya 18: 11–14. 1918.—*Helianthus annus* × *petiolaris* is described as a new hybrid, grown under control conditions. [See Bot. Absts. 1, Entry 15.]

1082. Fernald, M. L. **American variations of Epilobium, section Chamaenerion.** Rhodora 20: 1–10. 1918.—The numerous variations of *Epilobium angustifolium* L. are reduced by the author to forma *albiflorum*, forma *spectabile*, var. *macrophyllum*, var. *intermedium*, and var. *platyphyllum*. A discussion on the supposed hybridization between *Epilobium angustifolium* and *E. latifolium* is also presented.

1083. Fernald, M. L. **Some American Epilobiums of the section Lysimachion.** Rhodora 20: 29–39. 1918.—*Epilobium densum* Raf., var. *nesophilum* Fernald is described as a new variety from Newfoundland and the Magdalen Islands, and *E. molle* Torr., var. *sabulonense* Fernald, also a new variety, from Sable Island off Nova Scotia. *Epilobium glandulosum* Lehm. and *E. adenocaulon* Haussk. are discussed in detail and treated as conspecific; and six varieties are characterized under *E. glandulosum*. A new species, *Epilobium Steckerianum*, is recorded from Labrador.

1084. Fernald, M. L. **The North American Littorella.** Rhodora 20: 61–62. 1918.—The American plant hitherto known as *Littorrella uniflora* is shown to be specifically distinct from *L. uniflora* (L.) Asch. of Europe, and to it is given the name *Littorella americana* Fernald.

1085. Fernald, M. L. **The validity of Oxalis americana.** Rhodora 20: 76–78. 1918.—Fernald points out that the American plant commonly known as *Oxalis Acetosella* should take the name *O. americana* Bigelow, and describes the pink-flowered form of this species as *rhodantha.*

1086. Fernald, M. L. **Rosa blanda and its allies of northern Maine and adjacent Canada.** Rhodora 20: 90–96. 1918.—The writer discusses *Rosa blanda* Ait. and its near relatives and includes descriptions of two new species namely *Rosa johannensis* with its white flowered form *albina* from the St. John Valley, and *Rosa Williamsii* from Quebec.

1087. Fernald, M. L., and K. M. Wiegand. **Some new species and varieties of Poa from North America.** Rhodora 20: 122–127. 1918.—The authors have published the following new species and variety of *Poa: P. saltuensis*, its variety *microlepis*, and *P. paludigena.*

1088. Fernald, M. L. **The American representations of Equisetum sylvaticum.** Rhodora 20: 129–131. 1918.—The author describes a new form of the above species namely, var. *pauciramosum*, forma *multiramosum* Fernald.

1089. Fernald, M. L. **Some allies of Rynchospora macrostachya.** Rhodora 20: 138–140. 1918.—Fernald discusses the detailed characters of *Rynchospora macrostachya* Torr. and *R. corniculata* (Lam.) Gray, raises *R. macrostachya*, var. *inundata* Fernald and *R. macrostachya*, var. *patula* Chapm. to specific rank (renaming the latter as *Rynchospora Careyana* Fernald), and describes a new variety namely, *R. corniculata* (Lam.) Gray, var. *interior* Fernald, which ranges in distribution from Alabama to Texas, Arkansas, and Indiana.

1090. Fernald, M. L. **The specific identity of Bidens hyperborea and B. colpophila.** Rhodora 20: 146–150. 1918.—The author concludes that *Bidens colpophila* Fernald & St. John is conspecific with *B. hyperborea* Greene, and differentiates three varieties of the latter namely, *colpophila, cathancensis,* and *gaspensis.*

1091. Fernald, M. L. **Carex paupercula, var. brevisquama, n. var.** Rhodora 20: 152. 1918.—This new variety of sedge is described from material collected in Charlevoix County, Quebec.

1092. Foxworthy, F. W. **Philippine Dipterocarpaceae. II.** Philip. Jour. Sci. Bot. 13: 163–199. *Pl. 1, 2.* 1918.—The author presents a revision of the Dipterocarpaceae of the Philippine Islands, recognizing nine genera and seventy species of which seventeen are described as new to science.

1093. Gates, R. Ruggles. **A systematic study of the North American Melanthaceae from the genetic standpoint.** Jour. Linn. Soc. Bot. 44: 131–172. *Pl. 5.* 1918.—The title of this paper is aptly chosen to indicate the point of view from which the study was approached. The author makes no pretence to an exhaustive taxonomic treatment of the Melanthaceae but rather presents a general survey of a relatively compact group of genera (about twenty) based primarily on characters arising from definite and often discontinuous variation, par-

ticularly with reference to the genesis and relationships of the different generic elements included. Several new combinations occur in the text.

1094. Greenman, J. M. **Monograph of the North and Central American species of the genus Senecio.** Part II. Ann. Missouri Bot. Gard. 5: 37–107. *Pl. 4–6.* 1918.—The present installment treats the section *Tomentosi* Rydb. which comprises thirty-five species and several varieties. Two new species *Senecio Muirii* from California and *S. molinarius* from Colorado, are proposed, and a few new varieties, new combinations, and new names are included.

1095. Greenman, J. M., and Norma E. Pfeiffer. **A new Selaginella from Mexico.** Ann. Missouri Bot. Gard. 5: 205–210. *Pl. 11–12.* 1918.—A new species of the *Selaginella rupestris* group, *S. Landii*, is described from the granite boulders of the San Estaban Mountains in the State of Jalisco, Mexico, and dedicated to its collector.—*Norma E. Pfeiffer.*

1096. Henry, J. K. **A new variety of Rubus parviflorus.** Torreya 18: 54–55. *Fig. 1.* 1918.—*Rubus parviflorus* Nutt. var. *Fraserianus* Henry is illustrated and described as a new species from Vancouver Island.

1097. Johnston, I. M. **Some undescribed plants from southern California.** Bull. S. California Acad. Sci. 17: 63–66. 1918.—The author describes a new species of *Lupinus* (*L. elatus*), four new varieties in different genera, and places on record distributional notes on plants of southern California.

1098. Koorders, S. H. **Botanisch overzicht der Rafflesiaceae van Nederlandsch-Indië. Met determinatietabellen en soortbeschrijvingen, hoofdzakelijk naar Solms-Laubach.** *8vo. vi + 128 p., 19 pl., and Neuwe Addenda 124[13], 124[18].* G. Kolff & Co., Batavia, May, 1918.—A general consideration of the Rafflesiaceae of the Indo-Malayan region including the Philippines, accompanied by a full bibliography, keys to genera and species, and descriptions. Thirteen species of *Rafflesia* are recognized including the following new ones: *Rafflesia borneënsis* Koord., Borneo, *R. Witkampi* Koord., Borneo, *R. ciliata* Koord., Borneo, *R. zollingeriana* Koord., Java, and *R. atjehensis* Koord., northern Sumatra, with four additional ones which the author could determine only to the genus, and which are apparently new species. The other genera considered as *Brugmansia* with two species, *Richthofenia*, one species, and *Sapria*, one species. The photographic reproductions of *Rafflesia Arnoldii R.* Br. from the type locality (Bencolen, Sumatra) are especially good.—*Elmer D. Merrill.*

1099. Macbride, J. Francis. **A new species of Bladdernut.** Rhodora 20: 127–129. 1918.—*Staphylea Brighamii* Macbride is described. The type was collected near Toledo, Ohio.

1100. Macbride, J. Francis. **A new Perezia adventive in Massachusetts.** Rhodora 20: 150–152. 1918.—*Perezia aletes* Macbride is described as a new species. The plant was introduced into New England through seed in wool brought from South America.

1101. MacCaughey, Vaughan. **The Hawaiian Violaceae.** Torreya 18: 1–11. 1918.—Eleven species and varieties of *Viola* and three species of *Isodendrion* are enumerated from the Hawaiian Islands. A compiled description is given of each species and variety.

1102. MacCaughey, Vaughan, **The genus Gleichenia (Dicranopteris) in the Hawaiian Islands.** Torreya 18: 41–52. 1918.—Four species of *Gleichenia* are recognized from Hawaii; a description and notes are given of each species.

1103. Marshall, E. S. **Three apparently undescribed Irish Saxifrages.** Jour. Bot. 56: 65–67. 1918.—One new species of *Saxifraga* and two new varieties are described from Ireland.

1104. Maxon, William R. **A new Polystichum from California.** Jour. Washington Acad. Sci. 8: 620–622. 1918.—*Polystichum Dudleyi* is described from the Santa Cruz peninsula. The species is named in honor of the late Professor William R. Dudley.

1105. Maxon, William R. **The lip-ferns of the southwestern United States related to Cheilanhes myriophylla.** Proc. Biol. Soc. Washington 31: 139–152. 1918.—The author concludes that *Cheilanthes myriophylla* is an andine species extending from northern Mexico to Bolivia and Argentina, but does not occur in the United States. Under the above title five species and one subspecies are treated in detail, and of these the following are new: *Cheilanthes Wootoni*, *C. Covillei*, and *C. Covillei* subsp. *intertexta.*

1106. Merrill, E. D. **The Bornean species of Eugenia, Schefflera, and Saurauia, represented in the Singapore Herbarium.** Jour. Straits Branch R. A. Soc. No. 79: 19–35. 1918.—Twenty-three species of *Eugenia* are recorded from Borneo, and of this number *E. Kingii*, *E. monantha*, *E. subracemosa*, *E. subsessilifolia*, *E. lunduensis*, and *E. rhynchophylla* are published as new. To the six species of *Schefflera* hitherto known from Borneo, the following are added and described as new: *Schefflera borneensis*, *S. Burkillii*, *S. Havilandii*, and *S. racemosa*. Nine species of *Saurauia* are listed of which the following are described and indicated as new: *Saurauia glabra*, *S. spinulososetosa*, *S. Ridleyi*, and *S. Havilandii*. *Saurauia oblancifolia* Merrill, a new specific name, is given to *S. oblanceolata* Merrill, not Ridley.

1107. Merrill, E. D. **New or noteworthy Philippine plants. XIII.** Philip. Jour. Sci. Bot. 13: 1–66. 1918.—The present paper, like the preceding ones in this series, is devoted primarily to the description of new species. Those here proposed are: *Alocasia Wenzelii*, *A. maquilingensis*, *Aneilema humile*, *Smilax erecta*, *S. lucida*, *Quercus cagayanensis*, *Q. Mabesae*, *Elatostema gracilifolium*, *Aristolochia humilis*, *Cocculus sarmentosus* (Lour.) Diels, var. *stenophyllus*, *Michelia platyphylla*, *Matthaea intermedia*, *Capparis longipes*, *C. ilocana*, *Rubus Edanoii*, *Connarus subfoveolatus*, *Albizzia magaladenia*, *Neptunia depauperata*, *Spatholobus philippinensis*, *Evodia glaberrima*, *Tetractomia pachyphylla*, *Hippocratea megalocarpa*, *H. trichopetala*, *Salacia euphlebia*, *S. Wenzelii*, *Nephelium Schneideri*, *Ortophora cauliflora*, *Ventilago brunnea*, *Tetrastigma corniculatum*, *Elaeocarpus bontocensis*, *E. surigaensis*, *Abelmoschus Vanoverberghii*, *Sida longistipula*, *Saurauia Alvarezii*, *S. bicolor*, *S. glabrifolia*, *Casearia euphlebia*, *C. confertiflora*, *Homalium multiflorum*, *H. platyphyllum*, *H. villosum*, *Begonia Castilloi*, *B. tayabensis*, *B. apayaoensis*, *B. binuangensis*, *B. caudata*, *Mastixia tetrapetala*, *M. subcaudata*, *Boerlagiodendron Yatesii*, *B. Fenicis*, *B. tayabense*, *Diospyros Velascoi*. *D. tayabensis*, *Bassia cagayanensis*, *Ardisia nigromaculata*, *A. rivularis*, *Fragraea Curranii*, *F. Macgregorii*, *Alyxia revoluta*, *A. glabra*. *A. lanceolata*, *A. laxiflora*, *Kopsia laxinervia*, *Erycibe Sargentii*, *Callicarpa platyphylla*, *Solanum luzoniense*, *S. luzoniense* var. *glabrum*, *Hemigrapihs viridis*, *H. hirsutissima*, *H*, *pauciflora*, *Justicia dispar*, *Lepidagathis microphylla*, and *Alsomitra pubescens*. A new genus, **Ilocania** of the Cucurbitaceae, is described with a single species, *I. pedata*, from the island of Luzon.

1108. Merrill, E. D. **Species Blancoanae. A critical revision of the Philippine species of plants described by Blanco and by Llanos.** Bur. Sci. Publ. No. 12. *412 p., 1 folded map.* Manila [P. I.], 1918.—This work is concerned primarily with an enumeration of the species of Blanco's *Flora de Filipinas* and an interpretation of those species in the light of present knowledge of the Philippine flora. Opposite each Blancoan plant-name listed is given the name with which it is regarded by the author as synonymous. The text is amplified by copious annotations. Several sets of carefully prepared exsiccata have been distributed to leading herbaria; these specimens amply illustrate the author's interpretation, and make the work " Species Blancoanae " of practical value to the student of the Philippine flora.

1109. Merrill, E. D. **New species of Bornean plants.** Philip. Jour. Sci. Bot. 13: 67–122. 1918.—This paper is the third of a series dealing with the Bornean flora and contains descriptions of sixty-one new species in the families Magnoliaceae, Connaraceae, Leguminosae, Rutaceae, Meliaceae, Euphorbiaceae, Sterculiaceae, Dilleniaceae, Passifloraceae, Flacourtiaceae, Myrtaceae, Araliaceae, Clethraceae, Myrsinaceae, Oleaceae, Gentianaceae, Asclepiadaceae, and Rubiaceae.

1110. Merrill, E. D. **Notes on the flora of Loh Fau Mountain, Kwangtung Province, China.** Philip. Jour. Sci. Bot. 13: 123–161. 1918.—The author lists several genera and fifty-three species not hitherto recorded from Kwantung Province. Twenty-four species are described as new.

1111. Moore, Spencer Le M. **Alabastra diversa. Part XXVIII.** Jour. Bot. 56: 4–11, 36–40. 1918.—These studies are based on collections made in Africa by Archdeacon Rogers. Nineteen new species and one new variety of flowering plants are described, distributed among several genera.

1112. Moore, Spencer Le M. **Alabastra diversa. Part XXIX.** Jour. Bot. 56: 204–212, 225–233. 1918.—The author describes twenty-eight new species of Compositae from Africa, including a new genus, *Emiliella*, of the Senecionideae. One new species of *Jatropha* from Brazil is also characterized.

1113. Mosher, Edna. **The grasses of Illinois.** Univ. Illinois Agric. Exp. Sta. Bull. 205: 261–425. *287 fig.* 1918.—The aim of the author in this work has been to list all species of grasses known to occur in the state of Illinois. A key to the genera precedes the enumeration of species. Each species is described briefly, and the description is followed by a note on distribution and a paragraph containing citations of *exsiccata*. A limited synonomy and a very abbreviated bibliography are included. Sixty-three genera represented by two hundred and four species are listed in the publication.

1114. Nelson, A., and J. Francis Macbride. **Western plant studies. V.** Bot. Gaz. 65: 58–70. 1918.—This paper contains a partial synopsis of northwestern members of the genus *Clarkia*; a new clover, *Trifolium Leibergii*; a new gentian, *Gentiana Covillei*; a new species of *Pentstemon* namely, *P. Albrightii* A. Nels.; new specific names as follows: *Allium scissum* (*A. incisum* Nels. & Macbr., not Fomine), *Clarkia superba* (*Godetia grandiflora* Lindl., not *Clarkia grandiflora* (F. & M.) Greene), *Tonestus eximius* (*Haplopappus eximius* Hall), *Prenanthes hastata* (*Sonchus hastata* Less.); and the following new combinations: *Sisyrinchium boreale* (*Hydastylus borealis* Bickn.), *Brodiaea coronaria* (*Hookera coronaria* Salisb.), *Clarkia delicata* (*Godetia delicata* Abrams), *C. biloba* (*Oenothera biloba* Durand), *C. epilobioides* (*Oenothera epilobioides* Nutt.), *C. Whitneyi* (*Oenothera Whitneyi* Gray), *C. amoena* (*Oenothera amoena* Lehm.), *C. amoena* forma *concolor* (*Godetia amoena* var. *concolor* Jepson), *C. amoena* forma *Lindleyi* (*Oenothera Lindleyi* Dougl.), *C. arcuata* (*Oenothera arcuata* Kell.), *C. caurina* (*Godetia caurina* Abrams), *C. Romanzovii* (*Oenothera Romanzovii* Ledeb.), *C. gracilis* (*Godetia gracilis* Piper), *A. quadrivulnera* (*Oenothera quadrivulnera* Dougl.), *C. viminea* (*Oenothera viminea* Dougl.), *C. purpurea* (*Oenothera purpurea* (Curtis) Bot. Mag. *pl. 352*), *K. Arnottii* (*Oenothera Arnottii* T. & G.), *C. decumbens* (*Godetia decumbens* Dougl.), *Nemophila pedunculata* Dougl. var. *sepulta* (*N. sepulta* Parish), *N. pedunculata* Dougl. var. *densa* (*N. densa* Howell), *N. heterophylla* F. & M. var. *tenera* (N. *tenera* Eastw.), *Pentstemon pandus* (*P. perpulcher* var. *pandus* Nels.), and *Castilleja miniata* Dougl. var. *Dixonii* (*C. Dixonii* Fernald).

1115. Nelson, J. C. **Additions to the flora of western Oregon.** Torreya 18: 21–35. 1918.—One hundred and fifty-three species of flowering plants are here listed as having been collected within the Oregon limits of Piper and Beattie's "Flora of the Northwest Coast," but not mentioned in that work. About sixty per cent. of this number, however, are said to be introduced. A second list of forty-five species of flowering plants is given, showing extension in hitherto recorded geographical range.

1116. Osterhout, Geo. E. **A new Hymenopappus from Colorado.** Torreya 18: 90. 1918. —*Hymenopappus polycephalus* Osterhout is described as a new species.

1117. Parish, S. B. **Notes on some southern California plants.** Bot. Gaz. 65: 334–343. 1918.—Parish records several species not hitherto reported from California, also several ad-

ditions to the known flora of the southern counties of the state. One new variety of clover, *Trifolium gracilentum* var. *reductum* Parish is described from Pilot Knob, Mojave Desert.

1118. Paulsen, Ove. **A new Cereus from the West Indies.** Jour. Bot. **56**: 235. 1918.—*Cereus venditus* is described as a species new to science, based on collections made by Eug. Warming on the island of St. Jan.

1119. Payson, Edwin Blake. **The North American species of Aquilegia.** Contrib. U. S. Nation. Herb. **20**: 133–157. *Pls. 8–14.* 1918.—The author finds that flower-structure presents the most constant differences and is of the highest value taxonomically. The genus embraces twenty-five species in North America; these are grouped in three sections namely, *Cyrtoplectrae*, *Rhodanthae*, and *Microplectrae*. The first section, typified by *Aquilegia saximontana*, represents the most primitive and probable ancestral type of the genus, and the *Macroplectrae*, typified by *A. longissima*, the most highly specialized and perhaps the most recent development. The comparative floral structure and phylogenetic relationship are graphically shown in a full-page illustration. The following new species are described: *Aquilegia lithophila*, *A. triternata*, *A. wawawensis*, *A, formosa* subsp. *dissecta*, and *A. formosa* subsp. *caelifax*. Three new combinations are included.

1120. Pittier, Henry. **New or noteworthy plants from Colombia and Central America.** 7. Contrib. U. S. Nation. Herb. **20**: x + 95–132. 1918.—The author includes descriptions of upwards of thirty new species of flowering plants, belonging mostly to the Leguminosae. Several of the older and incompletely characterized species are redescribed in the light of recently acquired and more complete specimens.

1121. Praeger, R. Lloyd. **Notes on Sedum.** II. Jour. Bot. **56**: 149–152. 1918.—In continuation of his studies on the genus *Sedum* the author describes two new species, *S. floriferum* from Wei-hai-Wei, China, and *S. Taquetii* from Korea, and two new varieties of probable Japanese origin.

1122. Ridley, H. N. **Hoseanthus Merrill, n. gen.** Jour. Straits Branch R. A. Soc. No. **79**: 19. 1918.—The author reinstates *Hosea* Ridley a genus of the Verbenaceae, on the ground that the earlier *Hosea* Dennstedt was a *nomen nudum*, thus reducing *Hoseanthus* Merrill to synonomy.

1123. Ridley, H. N. **New and rare Malayan Plants. Series X.** Jour. Straits Branch R. A. Soc. No. **75**: 63–100. 1918.—This article consists mainly of the descriptions of new species a list of which follows: *Sterculia brachycarpa*, *Eugenia limnoea*, *E. pauper*, *E. cyrtophylloides*, *E. Klossii*, *E. cordifoliata*, *Melastoma scabrum*, *Osbeckia perakensis*, *Allomorphia malaccensis*, *Sonerila patula*, *S. belluta*, *S. setosa*, *Memecylon Cantleyi*, *M. longifolium*, *M. grailipes*, *M. floribundum*, *M. malaccense*, *Uncaria parviflora*, *Coptosapelta parviflora*, *Argostemma rugosum*, *A. nervosum*, *A. grandiflora*, *A. trichanthum*, *Mussaenda spectabilis*, *Urophyllum coriaceum*, *Randia oocarpa*, *M. incurva*, *M. Roxburghii*, *Gardenia elata*, *Petunga conifera*, *Timonius hirsutus*, *Coffea viridiflora*, *Ixora montana*, *I. crassifolia*, *I. patens*, *I. fluminalis*, *Lasianthus bractescens*, *L. crassifolius*, *L. politus*, *L. villosus*, *L. glaberrimus*, *Morinda elliptica*, *Coelospermum biovulatum* Clarke, *Psychotria rudis*, *P. setistipula*, *P. minutiflora*, *Cephaelis angustifolia*, *C. elliptica*, *C. triceps*, *C. elongata*, *Erigeron oreophilum*, *Vaccinium loranthifolium*, *V. Wrayi*, *Ardisia singaporensis*, *Pelaquium calophylloides*, *Payena lanceolata*, *P. utilis*, *Linociera spicifera*, *L. parvifolia*, *Alstonia micrantha*, *Micrechites furcata*, *M. brachypetala*, *M. tenuifolia*, *Dischidia fruticulosa*, *Fagraea caudata*, *F. gigantea*, *Gaertnea sessiliflora*, *G. pedicellata* and *Monochoria elata*. One new genus, **Perilimnastes,** of the Melastomaceae is proposed being based on *Anerincleistus fruticosus* Ridl.

1124. Rock, Joseph F. **New species of Hawaiian plants.** Bull. Torr. Bot. Club **45**: 133–139. *Pl. 6.* 1918.—The following new species of plants are described: *Cyanea Giffardii*, *C. rollandiodidies*, *Rollandia angustifolia* (*R. longifolia* β var. *angustifolia* Hillbr.), *Lobelia oahuensis*, and *Straussia glomerata*.

1125. ROCK, JOSEPH F. **Pelea and Platydesma.** Bot. Gaz. 65: 261-267. *Fig. 1.* 1918.—The author presents critical notes on the two Rutaceous genera mentioned in the title and describes the following as new to science: *Pelea Gayana* (*P. sapotaefolia* Mann. var. (?) *procumbens* Hdb.), *P. cinerea* (Gray) Hbd. var. *rubra*, and *P. recurvata* (*P. kauaiensis* Hbd., not Mann.)

1126. SAFFORD, W. E. **Chenopodium Nuttalliae, a food plant of the Aztecs.** Jour. Washington Acad. Sci. 8: 521-527. *Fig.* 3. 1918.—The author describes and illustrates a new species of *Chenopodium* from Mexico under the name given in the title.

1127. SARGENT, C. S. **Notes on North American trees. I. Quercus.** Bot. Gaz. 65: 423-459. 1918.—This article consists of critical notes on North American oaks with descriptions and copious citations of material of several new species and varieties, chiefly from the southern and southwestern United States. Several new hybrid oaks are also defined and to these binomial names have been given.

1128. SARGENT, C. S. **Notes on North American trees. III. Tilia. I.** Bot. Gaz. 66: 421-438. 1918.—The author presents an introductory article on a synoptical treatment of the American lindens. Fifteen species are included in the key and seven of these are described in detail. Five of the seven species described and seven varieties are characterized as new.

1129. SAXTON, W. T., AND L. J. SEDGWICK. **Plants of northern Gujarat.** Records Bot. Surv. Ind. 6: 207-323. *Index, i-xiii, 1 folded map.* 1918.—The authors divide their paper into three parts namely, Part I " Descriptive and Analytical," Part II "Oecology," and Part III " Flora." Under the last caption upwards of 600 endemic or well established species of flowering plants are enumerated. No new species nor varieties are included.

1130. SMITH, CHARLES PIPER. **Studies in the genus Lupinus. II. The Microcarpi, exclusive of Lupinus densiflorus.** Bull. Torr. Bot. Club 45: 1-22. *Figs. 1-16.* 1918.—The present paper deals with the species of the subgenus *Platycarpos* Watson, a group peculiar to the west coast of America, in which the author recognizes six species namely, *Lupinus malacophyllus* Greene, *L. microcarpus* Sims, *L. horizontalis* Heller, *L. subvexus* C. P. Smith, *L. luteolus* Kell., and *L. densiflorus* Benth. The first five species are treated in detail, and several varieties are characterized. The same author (*ibid.* 167-202, *figs. 17-42*) discusses *Lupinus densiflorus* Benth. and differentiates twenty-five varieties.

1131. STANDLEY, PAUL C. **The North American species of Genipa.** Jour. Washington Acad. Sci. 8: 639-643. 1918.—The author describes two new species of the Rubiaceae from Panama namely, *Genipa Maxonii* and *G. Williamsii.*

1132. STEPHENSON, T., AND T. A. STEPHENSON. **A new form of Helleborine viridiflora.** Jour. Bot. 56: 1-4. 1918.—A new form, *vectensis*, of this species is recorded from the Isle of Wight.

1133. WERNHAM, H. F. **New Rubiaceae from the Belgian Congo.** Jour. Bot. 56: 308-314. 1918.—The following new species of Rubiaceae are described: *Mussenda Nannanii*, *Sabicea congensis*, *Stipularia mollis*, *Tricalysia ealensis*, *Vangueria oblanceolata*, *Cuviera latior*, *Ixora Vermoesenii*, *Rutidea Vanderystii*, *Globulostylis cuvieroides*, and *Amaralia Batesii.*

1134. WERNHAM, H. F. **Dr. H. O. Forbes's New Guinea Rubiaceae.** Jour. Bot. 56: 68-77, 129-135. 1918.—Twenty-eight new species and a new variety are described, based on collections made in New Guinea in 1885-1886.

1135. WERNHAM, H. F. **The Genus Manettia.** Jour. Bot. 56: (Supplement) 1-16. 1918.—In continuation of his studies on tropical American Rubiaceae the author has begun a detailed revision of *Manettia*, a genus occurring chiefly in the American tropics.

1136. WHITE, J. W. **Notes supplemental to the flora of Bristol.** Jour. Bot. 56: 11-18, 40-49, 77-87. 1918.—Critical notes on a relatively large number of species are recorded, which are of particular interest to the student of the English flora.

1137. WIEGAND, K. M. **Some species and varieties of Elymus in eastern North America.** Rhodora 20: 81-90. 1918.—This paper deals with *Elymus virginicus* and *F. canadensis* L. and their immediate allies. Seven species and several varieties are described and of these one species, *E. riparius*, and one variety, *E. robustus* var. *vestitus*, are characterized as new to science. *E. halophilus* Bicknell is treated as a variety of *E. virginicus* L.; and *E. glabriflorus* Scribner & Ball is treated as a variety of *E. australis* Scribner & Ball.

1138. WIEGAND, K. M. **A new variety of Triosteum aurantiacum.** Rhodora 20: 116. 1918.—*Triosteum aurantiacum* var. *glaucescens* Wiegand is described from central New York and Pennsylvania.

1139. WILMOTT, A. J. **Two new plants from Macedonia.** Jour. Bot. 56: 145-146. 1918.—*Paliurus microcarpus* and *Calamintha epilosa* are described; both species were discovered near Salonica.

1140. WOLF, W. **Quercus bernardiensis sp. nov.** Torreya 18: 161-162. 1918.—This new species of oak is described from specimens collected in Cullinan County, Alabama.

Vol. I JANUARY, 1919 No. 5

ENTRIES 1141-1439

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CONTENTS

NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for all of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2, although some of them are shown on cover page 1 of the present issue.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any editor.

An author's index and an index to sections, together with a list of names of abstracters and of serials cited in volume 1 will accompany volume 2, No. 1. No subject index will be supplied until the end of volume 2, there being a single index for the two volumes.

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The Johns Hopkins University, Baltimore, Maryland

Vol. I JANUARY, 1919 No. 5

ENTRIES 1141-1439

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1141. COOK, MEL. T. **Modern application of botany.** Paper read at Dedication Exercises of Brooklyn Botanic Garden, April 16, 1917. Mem. Brooklyn Bot. Gard. 1: 123-127. July 6, 1918.—Gives brief discussion of the relation of the economic importance of botany. Reviews the relationship of early botanical work to medicine, and the gradual development of the subject. Refers to the relationship that should exist between botany and allied subjects. Discusses the future of botany in America, giving special attention to its application through plant physiology, plant breeding, and plant pathology. Special attention is called to the relationship of plant pathology to research along lines of taxonomy, morphology, and physiology. Attention is also called to the unfortunate conditions which tend to broaden the gap between botany on the one side and horticulture, agronomy, and forestry on the other. —*M. T. Cook.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

[Unsigned abstracts are by the editor.]

1142. ADAMSON, R. S. **On the relationship of some associations of the southern Pennines.** Jour. Ecol. 6: 97-109. *2 fig.* June, 1918.—Upon the broader tops of these hills, at elevations of 1000 to 1200 feet, are areas of moorland characterized by deep wet peat occupied by a plant association dominated by *Eriophorum vaginatum*. This association is, however, largely in stages of decay and replacement due to the cutting back of streams and the resultant drainage of the peat. Upon the drained peat *Empetrum nigrum* appears followed by *Vaccinium myrtillus*. When removal of the peat accompanies drainage a grassland association dominated by *Nardus stricta* often appears.

On the slopes and at lower altitudes with thinner peat mingled with soil are associations of *Deschampsia flexuosa*, *Nardus stricta*, *Vaccinium myrtillus*, and *Calluna vulgaris* in a more or less definite successional series ending with the *Calluna* association. The present large extent of the grassland associations, recognized as earlier or degenerate stages in the succession, is ascribed to a large extent to the effects of sheep grazing.—*Geo. D. Fuller.*

1143. COWLES, HENRY C. **Retrogressive and progressive successions in the Arkansas Sunk-Lands.** Jour. Ecol. 6: 95-96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—The sunk country of the Mississippi bottomlands

has for the most part two types of progressive successions, both hydrarch as to origin. One, of course, is the familiar flood plain succession, starting with the sand bars and having successive belts of invading vegetation, commencing with willows and followed later by the sycamore, cottonwood, and other flood plain pioneers. Then follows a long-enduring temporary climax (subclimax) composed of bottom land oaks, hickories, hackberry, etc. The second progressive hydrarch succession occurs in cut-offs, incident to changes in the river channel. Here there develop the familiar cypress swamps, following the more primitive aquatic stages. These swamps also develop into the above named flood plain temporary climax. The earthquake of 1811 caused an extensive sinking of the earth's crust over vast areas of the Mississippi bottoms, thus instituting a sudden retrogression in the vegetable development. Probably much of the area now covered by cypress swamps had reached the above noted temporary climax or even the regional climax at the time of the earthquake. Since that time it is probable that the vegetational course has been essentially progressive. This region presents a sharp contrast in the suddenness of vegetative change produced by the earthquake to the more common (and usually overlooked) retrogressive changes brought about by gradual subsidence or elevation.

1144. Harper, Roland M. **The plant population of northern lower Michigan and its environment.** Bull. Torrey Bot. Club 45: 23-42. *3 fig.* Jan., 1918.—Rev. by Fuller in Bot. Gaz. 66: 390-391. 1918. [See Bot. Absts. 1, Entry 9.]

1145. Hofman, J. V. **The influence of vegetation on reforestation in the Cascade Mountain Region.** Jour. Ecol. 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—This paper covers briefly the influence of shrubs and annuals on reproduction, whether natural or artificial. The conclusions are based on data gathered in connection with natural reproduction studies, and planting and sowing experiments during the past five years. The effect of different degrees of shading by the native vegetation on various sites such as north slope, south slope, etc., is shown. The general conclusions show that shading in this region is not an important factor except at the extreme limits of either site quality or density of shade.—*J. V. Hofman.*

1146. MacCaughey Vaughan. **Algae of the Hawaiian Archipelago.** I. Bot. Gaz. 65: 42-57. Jan., 1918.—A paper mainly ecological in its point of view. [See Bot. Absts. 1, Entry 200.]

1147. Munns, Edward N. **Some biological and economic aspects of the chaparral.** Jour. Ecol. 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—This paper embraces a discussion of evidence pointing to the fact that the so-called true chaparral of Southern California is temporary in its character and that tree growth existed prior to the brush and will again cover that area if given a full chance. The evidence presented in support of this view is that of the fossil deposits found at La Brea; the brush species of the north associated with the coniferous forests are also found in the south; stubs and charcoal remains of tree growth are found in dense brush areas where no one can recall such growth; trees (species of spruce and several pines) are in scattered stands in the chaparral; and plantations of coniferous trees have been successfully established. Fire has been the agency which is responsible for the decrease in tree growth and the increase in the brush areas, and if the fire rotation can be increased from its present rate to one greater than the tree rotation, trees will again come in naturally.—*Edward N. Munns.*

1148. Salisbury, E. J. **The oak hornbeam woods of Hertfordshire. Parts III and IV.** Jour. Ecol. 6: 14-52. *2 fig., 20 tables.* Mar., 1918.—In this region of England occur several thousand acres of oak forest characterized by an undergrowth of the hornbeam, *Carpinus Betulus.* Such forests are regarded as peculiar to light non-calcareous soil and seem to admit of division into two types, the first dominated by *Quercus Robur* formerly described by the same author (Jour. Ecol. 4: 83-117. 1916), and the other with *Q. sessiliflora* now discussed for the first time. Quantitative data on climate, humus and water content of the soil are pre-

sented as well as the results of light measurement within the forest during both the "light phase" and "shade phase" of the season, these phases being due respectively to the absence and presence of foliage. To these factors the various associations are related and the composition of the various communities is carefully examined. The humus and water contents of the *Quercus Robur* woods are found to be greater than those of the areas dominated by *Q. sessiliflora* while an analysis of the shrub and herbaceous flora shows that forests of the former type have many calcicolous species as contrasted with the calcifugous character of the *Q. sessilifllora* forest. Among the calcicole species cited are *Barbarea vulgaris, Sisymbrium alliaria, Arenaria trinervia,* and *Pimpinella major* contrasting with such calcifuges as *Stellaria uliginosa, Galium saxatile, Calluna vulgaris, Digitalis purpurea, Pteris aquilina Blechnum Spicant* and *Nephrodium montanum.* The *Q. Robur-Corylus* woods, the *Q. Robur-Carpinus* woods and the *Q. sessiliflora* woods form a series in which the flora becomes more and more calcifuge in character.—*Geo. D. Fuller.*

1149. WEIR, JAMES R. **Notes on the altitudinal range of forest fungi.** Mycologia 10: 4–14. Jan., 1918. [See Bot. Absts. 1, Entries 13, 449.]—Abst. in Jour. Roy. Microsc. Soc. **1918**: 222. 1918.

1150. WOODRUFFE-PEACOCK, E. ARDIAN. **A fox-covert study.** Jour. Ecol. 6: 110–125. 1918.—An area of woodland planted 120 years ago in North Lincolnshire, England, is studied particular attention being given to the success or failure of the tree species, the character of the undergrowth and the invasion and establishment of new species. Means of dispersal are carefully considered and species of more than ordinary interest noted. Man's influence in effecting changes is shown to be dominant.—*Geo. D. Fuller.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

1151. BRUSH, WARREN D. **Distinguishing characteristics of the North American sycamore woods.** Bot. Gaz. 64: 480–96. Dec., 1917.—The characteristics of the wood of the three species of sycamore (*Platanus*) native to the United States are dealt with. These three species are the common sycamore of the east (*P. occidentalis*), California sycamore (*P. racemosa*) and Arizona sycamore (*P. Wrightii*). The wood of all three is very similar in appearance and properties and requires magnification for positive identification. The paper contains a full description of the gross and minute structure of the wood of all three species, although *P. occidentalis* is given the most complete treatment. The three woods may best be distinguished by the differences in their medullary rays that are so prominent in them. *P. occidentalis* has the widest and lowest rays,—14 cells by 50 cells on the average, a ratio 1:5. *P. racemosa* has the narrowest and tallest,—4 by 107 cells, a ratio of 1: 26, while *P. Wrightii* is intermediate with rays averaging 8 by 84 cells or a ratio 1:12. Excellent microphotographs showing the three woods in cross and tangential section as well as *P. occidentalis* in radial section together with drawings of special parts fully illustrate the article. [See Bot. Absts. 1, Entry 985.]—*F. S. Baker.*

1152. DANA, SAMUEL T. **Finland's public-owned forests.** Canadian Forest. Jour. 14: 1727–29. June, 1918.—The forests of Finland are estimated to occupy over half the total area of the country and of this the State owns over 31,000,000 acres or half of the total. Only two-fifths of this is productive forest, the rest being swampy and marsh land, with some cultivated areas. Most of the State forests are in north Finland and consist of protection forests interspersed with areas of barren lands. Eight million acres of these lands in the extreme north are classed as protective forests and no financial returns are looked for. Since 1874 some 40,000 acres have been purchased at $5.13 per acre.

The stand per acre of productive forests varies from 486 cubic feet to 2000 cubic feet, averaging 715 cubic feet per acre in north Finland and 1430 in southern Finland. Eighty-five per cent of the forest products sold from the State forests in 1911 was saw timber to the value of $2,495,200. In 1912 the cut amounted to 6.43 cubic feet per acre from productive forest land. Sales are made by auction to the highest bidder. Trees are sold as single logs, the average price in 1912 was 83 cents varying between 12 cents and $1.93. Of this 76.6 per cent was Scotch pine (*Pinus sylvestris*) and 23.4 per cent Norway spruce (*Picea excelsa*).—Fire suppression has reduced the losses from fire to $12.05 per acre in 1912 when only 991 acres were burned over.—Three sawmills are operated by the State, originally to utilize undesirable timber as fuel for the State railways. Later, a considerable export business developed. By operating mills, the Government has obtained a clear insight into timber conditions in the international market and a better grasp of the lumber industry.—The income from the State forests in 1912 amounted to $2,726,853 or a net income of 12.7 cents per acre which is high for the poor quality of material and the relative inaccessibility of these forests. About 200 trained foresters are employed regularly, augmented by many temporary appointments. The University of Helsingsfors gives a three year course.—*E. N. Munns.*

1153. Harper, Roland M. **A phytogeographical sketch of southern Maryland.** Jour. Washington Acad. Sci. 8: 581–589. 1918.—For phytogeographic purposes the author divides the part of Maryland between Chesapeake Bay and the fall line into five regions. For each region the commonest native trees of saw-log size are listed in order of importance, the species more abundant than in any of the other regions being indicated as a means of picking out the characteristic species at a glance. The estimated percentage of evergreens in each region is given, as an index of soil fertility. The geology, topography, and salient forest conditions are briefly described and some notes on significant shrubs and herbs are added.—*E. H. Frothingham.* [See Bot. Absts. 2, Entry 903.]

1154. Langdon, La Dema M. **The ray system of Quercus alba.** Bot. Gaz., 65: 313–323. April, 1918.—This article is primarily a discussion of a study made to determine the effect of different conditions on the production of broad (multiseriate) rays and narrow (uniseriate) rays in white oak (*Quercus alba*). Neither age of the trees nor location of the wood in the tree was found to materially affect the ray systems. In suppressed growth due to shade, however, the multiseriate rays appeared only in later years, the delay being roughly proportional to the degree of suppression. It was also found that the position of multiseriate rays in one year seedlings was definitely related to the traces and that these are also responsible for the form of the young cylinder of xylem, which has a wavy outline of five lobes instead of a perfect circle. The article is prefaced by a brief discussion of the theories of the evolution of the medullary rays but the results of the present investigation are not definitely linked up with any of this work, although the influence of the leaf trace in causing the production of multiseriate rays is brought out. [See Bot. Absts. 1, Entry 581.]—*F. S. Baker.*

1155. Sampson, Arthur W. **Climate and plant growth in certain vegetative associations.** U. S. Forest Service Bull. 700. October, 1918.—The investigation seeks to correlate the growth of peas, wheat, and brome grass with physical factors in three vegetative associations or forest types in the Wasatch Mountains of Utah. A detailed climatic study by instrumental methods was made in the 3 types, which are arranged altitudinally as follows: Oak-brush, 6500 to 7800 feet; Aspen-fir, 7500 to 9500 feet; Spruce-fir, 9000 to 11,000 feet. The plants were grown in sealed pots at each of the three main climatic stations.

The climatic studies bring out the following relations: Mean annual temperature and length of growing season increase gradually from the highest to the lowest type. Precipitation increases with altitude up to the aspen-fir type, but above the apsen-fir type there is a slight decrease. Evaporation is greatest in the oak brush, slightly less in the spruce-fir, and considerably less in the aspen-fir. Wind movement is the greatest factor controlling evaporation; it is greater by 100 per cent in the spruce-fir than in the lower types. Sunshine duration

and intensity are practically the same in all the types. Only in the lowest type are the effective heat units and length of growing season sufficient to mature crops like wheat and peas. The rate at which plants mature decreases directly with the decrease in effective heat units. The water requirement for the production of a unit weight of dry matter is proportional to intensity of evaporation. Total production is inversely proportional to evaporation. Stem elongation is determined largely by temperature, and seems to be little influenced by evaporation. The photosynthetic efficiency of leaves as indicated by the production of dry matter appears to vary inversely with evaporation, although temperature is recognized as an important factor.—*G. A. Pearson.*

1156. STERRETT, W. D. **Utilization of ash.** U. S. Dept. Agric. Bull. 523. 52 *p. 10 pl., 3 fig.* June 29, 1917.—Although ash supplies only 2.5 or 3 per cent of the total hardwood lumber cut, it ranks among the leading North American hardwoods because of intrinsic qualities. There are 18 native species of ash, but 98 per cent of ash lumber is from three species—white ash (*Fraxinus americana*) most important in New England, the Middle Atlantic, and the Central States; green ash (*F. lanceolata*), in the South Atlantic States, the lower Mississippi Valley, and in Iowa, Kansas, Nebraska, and South Dakota; and black ash (*F. nigra*) in the Lake States. Census returns indicate an annual lumber cut of from 200,000,000 to 300,000,000 board feet, and the equivalent of 25,000,000 or 35,000,000 board feet cut into slack barrel stock. Practically the whole output is used in the manufacture of so-called secondary products (handles, butter tubs, vehicle stock, etc.). The total consumption appears about the same for ash as for hickory or cottonwood. Ash lumber production has passed its maximum and is decreasing. Tables showing the rank of States in amount of lumber cut for a series of years reveal a constant shifting in rank and a waning importance of old growth timber as compared with second growth. In seventeen years, ending 1915, the annual cut in the Lake States fell from (approximately) 38 to 15 per cent of the total, while production in the lower Mississippi rose from 18 to 32 per cent. Of the present supply two-thirds is second growth, chiefly in woodlots, and one-third is virgin timber, chiefly in large tracts. The supply of old growth may be exhausted in ten years, but second growth is likely to take its place and prevent any immediate heavy decrease in cut. The annual growth of ash in the United States is probably less than 160,000,000 board feet. The general characteristics and structure of the wood are described, and a key is given for identification of four commercial species. A chapter on mechanical properties of the wood, contributed by J. A. Newlin, tabulates the results of many tests on wood of different species of ash, and combines these in convenient terms for comparison. The effects of specific gravity, growth-rate, position in tree, age, heart and sap, and species upon the mechanical properties are discussed. Details of the use of ash by different industries are given, together with a discussion of lumber prices, costs of production, and value of standing timber.—*E. H. Frothingham.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

1157. ALLARD, H. A. **Some studies in blossom color inheritance in tobacco, with special reference to N. sylvestris and N. tabacum.** Amer. Nat. 53:79–84. Jan.–Feb., 1919.—*Nicotiana tabacum* with white, carmine, and pink-blossomed varieties and *Nicotiana sylvestris* with white blossoms were studied. Pink × carmine and reciprocals showed perfect dominance of carmine in F_1 and 3 : 1 segregation in F_2. Later generations and back crosses showed that results were due to a single factor difference. Both whites were recessive to either pink or carmine, although the F_1 carmine was lighter than parent. Carmine × white (*N. tabacum*) in F_2 segregated from white to carmine. Whites bred true although some with almost imperceptible sheen of color carried carmine factor giving both pinks and carmines when crossed with pink.—*Carl Kurtzweil.*

1158. ANONYMOUS. **Disease resistance.** Gard. Chron. **64**: 218. Nov. 30, 1918.—Comment on note in American Journal of Botany, January 1918, of work in isolating strains of asparagus resistant to rust; also that strains of tomatoes resistant to Fusarium wilt, flax resistant to *Fusarium lini* have been developed and their economic status established.—*C. E. Myers.*

1159. ANONYMOUS. **Butter fat percentage independent of age of cow.** Jour. Heredity **9**: 249. Oct., 1918.—Studies in Delaware College herd establish fact that age of a cow does not influence butter fat test of her milk, and, therefore, in study of inheritance behavior of this characteristic age of cow need not be considered.—*R. K. Nabours.*

1160. ANONYMOUS. **Fecundity in Rhode Island red breed of domestic fowl.** Jour. Heredity **9**: 333–334. Nov., 1918.—Review, with excerpts, of paper by Goodale on fecundity in Rhode Island reds. [See Bot. Absts. 1, Entry 881.] Compares results with those of Pearl on Barred Plymouth Rocks. Goodale finds that fecundity is influenced by other characters, such as broodiness and maturity, so that fecundity is not a good character to test effectiveness of selection; but with Pearl he agrees that fecundity is inherited.—*A. F. Shull.*

1161. ATKINSON, G. F. **Quadruple hybrids in the F_1 generation from Oenothera nutans and Oe. pycnocarpa, with the F_2 generations, and back crosses and intercrosses.** Genetics **2**: 213–260. *16 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 331. Mar., 1918.

1162. ATKINSON, G. F. **Twin hybrids from Oenothera Lamarckiana and Oe. franciscana when crossed with Oe. pycnocarpa.** Science **46**: 222. 1917.—Abst. in Exp. Sta. Rec. **37**: 820. Feb. 28, 1918.

1163. BACKHOUSE, G. O. **[The improvement of wheat in Argentina.]** Mon. Agric. Nac. Buenos Aires. Dir. Gen. Ensenanza e Invest. Agric. Pub. 73. *72 p. 17 fig.*—Abst. Exp. Sta. Rec. **38**: 741. June, 1918.

1164. BARKER, E. E. **Heredity studies in the morning glory (Ipomoea purpurea).** New York Cornell Agric. Exp. Sta. Bull. 392. *38 p., 3 pl.* 1917.—Abst. in Exp. Sta. Rec. **38**: 750. June, 1918.

1165. BAUR, ERWIN. **Mutationen von Antirrhinum majus. [Mutations of Antirrhinum majus.]** Zeitschr. indukt. Abstamm. Vererb. **19**: 177–193. 10 *fig.* June, 1918.

1166. BEIJERINCK, M. W. **The enzyme theory of heredity.** Proc. Kon. Akad. Wetensch. Amsterdam **19**: 1275. 1917.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. **19**: 202–203. June, 1918.

1167. BEIJERINCK, M. W. **De enzymtheorie der erfelijkheid. [The enzyme theory of heredity.]** Kon. Akad. Wetensch. Amsterdam **25**: 1231. 1917.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. **19**: 202–203. June, 1918.

1168. BIFFEN, R. H. **The suppression of characters on crossing.** Jour. Genetics **5**: 225–228. July, 1916.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. **19**: 218. June, 1918.

1169. BISSET, PETER. **Prolification in a double-flowered form of Calendula officinalis.** Jour. Heredity **9**: 323–325, *fig. 12, 13.* Nov., 1918.—Prolification in *Calendula* is uncommon. These plants were grown in Washington, D. C. in 1918. Writer's attention first attracted by strange behavior of several flower heads. Central head was apparently normal, but later produced several buds, some from center of flower head. These developed into secondary flower heads and opened fully, and in several instances again produced buds that developed flower heads (tertiary) each time smaller than the preceding. No seed developed and the plant being annual the variation was lost.—Author notes prolification in double-flowered

English daisy and also frequently among common roses which often takes form of prolonged flower stalk arising from center of parent flower, often producing leaves and a bud which later develops into a flower. The prolification in *Calendula* is attributed to environmental conditions.—*C. E. Myers.*

1170. Blakeslee, A. F., and B. T. Avery. **Adzuki beans and jimson weeds. Favorable class material for illustrating the ratio of Mendel's law.** Jour. Heredity 8: 125–131. *Fig. 4.* 1917.—Abst. in Exp. Sta. Rec. 37: 831. Feb. 28, 1918.

1171. Blakeslee, A. F., J. A. Harris, D. E. Warner, and W. F. Kirkpatrick. **Pigmentation and other criteria for the selection of laying hens.** Connecticut Storrs Exp. Sta. Bull. 92: *93–194. 23 fig.* 1917. Also abst. in Exp. Sta. Rec. 39: 74–75. July, 1918.

1172. Blakeslee, A. F., and D. E. Warner. **Correlation between egg-laying activity and yellow pigment in domestic fowl.** Amer. Nat. 49: 360–368. 1915.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 216–217. June, 1918.

1173. Blaringhem, L. **Les complexes végétaux et leurs disjonctions par la vieillesse.** Ann. inst. Pasteur 32: 60–70. 1918.—As plant chimera, *Cytisus Adami*, grows old, branches appear with all characteristics of one or other of the two constituents, *C. Laburnum* or *C. purpureus*. Hybrids of cereals also exhibit vegetative dissociation into characters of parents,—e.g., in some barley hybrids base of ear is of type of one parent and apex of ear of other, while intermediate region, where sterility is prominent, presents mosaic of the two characters. Anatomical analysis of tissues of plant hybrids confirms Naudin's hypothesis that hybrid is a mosaic in which discordant elements are not visible unless elements of same species come together, when there will result parts discernible to the eye as belonging to one of parent species. Suitable external conditions can accelerate this vegetative dissociation, and examples of this are cited. Parasitism of rusts and smuts is regarded as similar case of a plant complex, where the two constituents grow together for a time without injury to either. These complexes also dissociate themselves into their constituents, host plant and fungus, as result of certain abnormal conditions of growth, and when one or other member of complex approaches maturation. Influence of nutrition on relation of the two constituents of this complex is discussed. [Through abst. by W. S[tiles] in Physiol. Absts. 3: 292. July–Aug., 1918.]

1174. Bleuler, E. **Mendelismus bei Psychosen, speziell bei der Schizophrenie. [Mendelism in psychoses, especially in schizophrenia.]** Schweiz. Arch. Neurol. u. Psychiat. 1: 1917.—Italian abst. by E. Lugaro, in Riv. Patologia nerv. ment. 15: 60–61. Mar. 23,1918.

1175. Boring, Alice M., and T. H. Morgan. **Lutear cells and hen-feathering.** Jour. General Physiol. 1: 127–131. Sept., 1918.—In male of ordinary fowl, lutear cells characteristic of ovary of hen, are absent. In hen-feathered Sebright male, lutear cells are present in testes. Castration of Sebright male causes him to develop full plumage of ordinary cock. Removal of ovary of hen causes her also to develop full plumage of cock. It is plausible therefore that lutear cells produce internal secretion that suppresses, in hen-feathered Sebright male and in ordinary female, development of full plumage of ordinary cock. [Abst. by W. M. B[ayliss] in Physiol. Absts. 3: 458. Nov.-Dec., 1918.]—*C. B. Bridges.*

1176. Boring, Alice M., and Raymond Pearl. **Sex studies. XI. Hermaphrodite birds.** Jour. Exp. Zoöl. 25: 1–47. *9 pl., 9 fig.* 1918.—Abst. in Jour. Roy. Microsc. Soc. **1918**: 292: Sept., 1918.

1177. Brown, Thos. W. **Orange like fruit from a lemon tree.** Jour. Heredity 9: 303-310. *Fig., 4–6.* Nov., 1918.—Brief communication accompanied by photographs.—*M. C. Coulter.*

1178. Burger, O. F. **Variations in Colletotrichum gloeosporoides.** Phytopath. 7: 151. 1917.—Abst. in Exp. Sta. Rec. 38: 252. April 22, 1918.

1179. COCKERELL, T. D. A. **New forms of red sunflowers.** Gard. Chron. 64: 186. Nov. 9, 1918.—Two new series of *Helianthus annuus* described: (1) Vinous series, including *flavobasis*, *trizonatus*, *semivinosus*, *reversus*, *pallescens*, *passiflora*, and *apicalis*. (2) Chestnut series, including *apicalis*, *basalis*, *dilutus* and *latibasis*. Two forms of rays are described, *convolutus* and *revolutus*. Author desires information regarding new varieties of sunflower and Jerusalem artichoke.—*E. L. Proebsting.*

1180. COLE, L. J. **Determinate and indeterminate laying cycles in birds.** Anat. Rec. 11: 504–505. 1917.—Abst. in Exp. Sta. Rec. 37: 869. Feb. 28, 1918.

1181. COLLINS, G. N. **Hybrids of Zea tunicata and Z. ramosa.** Proc. Nation. Acad. Sci. U. S. Amer. 3: 345–349. 1917.—Abst. in Exp. Sta. Rec. 38: 525. June 14, 1918.

1182. COLLINS, G. N. **New place effect in maize.** Jour. Agric. Res. 12: 231–243. Feb., 1918.—Abst. in Exp. Sta. Rec. 38: 738–739. June, 1918. [See Bot. Absts. 1, Entry 17.]

1183. COLLINS, G. N., AND J. H. KEMPTON. **Breeding sweet corn resistant to the corn earworm.** Jour. Agric. Res. 11: 549–572. 1917.—Abst. in Exp. Sta. Rec. 38: 445. April, 1918.

1184. CORRENS, C. **Zur Kenntnis einfacher mendelnder Bastarde. I. Die Unterscheidung der pilulifera-Homozygoten und der Heterozygoten des Bastardes Urtica pilulifera Dodartii. II. Mirabilis jalapa xantha und ihre Bastarde. III. Urtica urens peraurea. [Contributions to knowledge of simple Mendelian hybrids. I. The distinguishing of pilulifera homozygotes and the heterozygotes of the hybrid Urtica pilulifera Dodartii. II. Mirabilis jalapa xantha and its hybrids.]** Sitzungsber. K. Preuss. Akad. Wiss. 1918: 221–268. 1918.—Attempt is made [in second paper] to estimate pigments in different varieties of *Mirabilis jalapa*. Conclusion is drawn that the chlorophyll varieties do not appear to originate from normal green type by disappearance of characters, but that characters become latent or suppressing factors come into operation. [Through Abst. by I. J[örgensen] in Physiol. Absts. 3: 299. July–Aug., 1918.]

1185. COULTER, MERLE C. **Self-sterility.** Bot. Gaz. 66: 461–462. Nov., 1918.—Discussion of: East, E. M., and J. B. Park. "Studies on self-sterility. I. The behavior of self-sterile plants." Genetics 2: 525–609. 1917. While praising work of these authors as "exemplary piece of research," questions adequacy of theory that occurrence of intra-sterile inter-fertile classes rests upon heterozygosis.

1186. COULTER, MERLE C. **Mutationists and selectionists.** Bot. Gaz. 66: 463–464. Nov., 1918.—Brief statement of controversy between those who, like Castle, hold that selection can modify unit characters, and those who maintain that modifications result from mutations which occur independently of direction of selection. Refers particularly to papers of H. S. Jennings, "Modifying factors and multiple allelomorphs in relation to the results of selection." (Amer. Nat. 51: 301–306. 1917.) and "Observed changes in hereditary characters in relation to evolution." (Jour. Washington Acad. Sci. 7: 281–301. 1917.) Holds that, at present, advantage seems to be with mutationists because of definiteness of basis provided for description of genetic phenomena.

1187. COULTER, MERLE C. **Continuous variation.** Bot. Gaz. 66: 540–541. Dec., 1918.—Brief note on: Stout, A. B. and Helene M. Boas. Statistical studies of flower number per head in *Chichorium intybus:* kinds of variability, heredity, and effects of selection. Mem. Torrey Bot. Club 17: 334–458. *Pl. 10–13.* 1918.

1188. COULTER, MERLE. **New place effect.** Bot. Gaz. 66: 541. Dec., 1918.—Brief discussion of: Collins, G. N. "New place effect in maize." Jour. Agric. Res. 12: 231–243. 1918. [See Bot. Absts. 1, Entry 17.]

1189. COULTER, MERLE C. **Dominance and parasitism.** Bot. Gaz. 66: 541. Dec. 1918.—Note on: Jones, D. F. "Segregation of susceptibility to parasitism in maize." Amer. Jour. Bot. 5: 295–300. 1918. Points out that Jones's conclusion that the most heterozygous maize, because most vigorous, will be most resistant to disease, can not be accepted as universal rule because some diseases are known to thrive best in the most vigorous hosts. Suggests that difference may depend upon fact that some diseases are immediately destructive to host, others not.

1190. COULTER, MERLE C. **Inheritance of height in peas.** Bot. Gaz. 66: 543. Dec., 1918.—Refers to recent work indicating that height in peas is affected by more than one factorial difference, particularly citing: O. E. White. "Inheritance studies in Pisum. III. The inheritance of height in peas." (Mem. Torrey Bot. Club 17: 316.) [See Bot. Absts. 1, Entry 250.], who concludes that there are at least 5 such factor differences, two affecting internode length and 3 internode number.

1191. COULTER, MERLE C. **Inheritance in Pisum.** Bot. Gaz. 66: 543. Dec., 1918.—Note on: O. E. White. "Inheritance studies in Pisum. IV. Interrelation of the genetic factors of Pisum." (Jour. Agric. Res. 11: 167–190. 1917.) [See Bot. Absts. 1, Entry 250.], especially commending section on "Modification of the expression of Pisum factors by different environments and by each other." States that this is one of first successful attempts to make intensive study of inheritance. Refers to similar work on corn being done under direction of R. A. Emerson at Cornell.

1192. COULTER, MERLE C. **Practical breeding.** Bot. Gaz. 66: 544. Dec., 1918.—Commends work of Collins, G. N., and J. H. Kempton, "Breeding sweet corn resistant to the corn earworm." (Jour. Agric. Res. 12: 549–572. 1917.), who have selected four superficial characters which were found to be correlated with amount of damage done by earworms.

1193. COULTER, MERLE C. **The morning glory in genetics.** Bot. Gaz. 66: 544. Dec., 1918.—Note on: Barker, E. E. Hereditary studies in the morning glory (*Ipomoea purpurea*). Cornell Univ. Agric. Exp. Sta. Bull. 392. *38 p., 3 pl.* 1917.

1194. COWGILL, H. B. **Vegetable improvement.** Porto Rico Dept. Agric. Sta. Rept. 1917: 27, 28. 1917.—Abst. in Exp. Sta. Rec. 39: 39. July, 1918.

1195. COWGILL, H. B. **Report of the plant breeder.** Porto Rico Dept. Agric. Sta. Rept. 1917: 15–26, 29–36. *6 fig.* 1917.—Abst. in Exp. Sta. Rec. 39: 33. July, 1918.

1196. DAHLGREN, K. V. O. **Eine acaulis-Varietät von Primula officinalis und ihre Erblichkeitsverhältnisse. [An acaulis variety of Primula officinalis and its inheritance.]** Svensk Bot. Tidskrift 10: 536–541. 1916.—Rev. by H. Rasmuson in Zeitschr. indukt. Abstamm. Vererb. 19: 220. June, 1918.

1197. DOWNEY, JUNE E. **Standardized tests and mental inheritance.** Jour. Heredity 9: 311–314. *Fig. 7.* Nov., 1918.

1198. EAST, E. M. **The behavior of self-sterile plants.** Science 46: 221–222. 1917.—Abst. in Exp. Sta. Rec. 37: 820. Feb. 28, 1918.

1199. EAST, E. M., AND J. B. PARK. **Studies on self-sterility. I. The behavior of self-sterile plants.** Genetics 2: 505–609. 1917.—Abst. in Exp. Sta. Rec. 38: 823. Aug. 9, 1918. [See also following Entry, 1200.]

1200. EAST, E. M., AND J. B. PARK. **Studies on self-sterility. II. Pollen-tube growth.** Genetics 3: 353–366. *3 fig.* July, 1918. [See also preceding Entry, 1199.]

1201. EDGERTON, C. W. **A study of wilt resistance in the seed-bed.** Phytopath. 8: 5–14. *fig. 1–4.* 1918. [See Bot. Absts. 1, Entry 94.]

1202. EUREN, H. F. **The heredity of dual-purpose cattle.** *96 p.* A. D. Euren: Norwich, England.—Abst. in Exp. Sta. Rec. 37: 866. Feb. 28, 1918.

1203. FEYTAUD, J. **Sur la reproduction parthénogenetique de l'Otiorhynque sillonne (Otiorhynchus sulcatus Fahr.)** [**On parthenogenetic reproduction of Otiorhynchus sulcatus.**] Compt. Rend. Paris 165: 767–769. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 48. Mar., 1918.

1204. FRUWIRTH, C. **Die Umzüchtung von Wintergetreide in Sommergetreide.** [The breeding of winter cereals into summer cereals.] Zeitschr. Pflanzenzüchtung 6: 1–46. Mar., 1918.—See Bot. Absts. 2, Entry 935.

1205. GATES, R. R. **Vegetative segregation in a hybrid race.** Jour. Genetics 6: 237–253. *1 pl.* 1917.—Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1206. GATES, R. R. **Heredity and mutation as cell phenomena.** Amer. Jour. Bot. 2: 519–528. 1915.—Rev. by M. J. Sirks in Zeitschr. indukt. Abstamm. Vererb. 19: 203–204. June, 1918.

1207. GLASER, OTTO. **Hereditary deficiencies in the sense of smell.** Science 48: 647–648. Dec. 27, 1918.—M, a Russian Jew from Kiev, lacks sense of smell. Alcohol, illuminating gas, ether, chloroform, flowers, or pepper, produce choking, sneezing, or various "feelings" only. Among M's relatives, characterized by stammering, early and complete loss of incisors, frequent hernia, a thumb nearly twice normal width, excessive sex interest, and considerable mental powers, are two normal sisters and following olfactory defectives: two brothers (one with slight sense of smell), mother, maternal grandfather, and a cousin, the daughter of a paternal aunt whose husband, from different family is "smell-blind." Trait is hereditary and possibly sex-linked. Large number of duplex females is explained by presence of many olfactory defectives in M's former place of residence.—*P. W. Whiting.*

1208. GOODALE, H. D. **Further data on the relation between the gonads and the soma of some domestic birds.** Anat. Rec. 11: 512–514. 1917.—Abst. in Exp. Sta. Rec. 37: 868–869. Feb. 28, 1918.

1209. GOODALE, H. D. **Crossing over in the sex chromosome of the male fowl.** Science 46: 213. 1917.—Abst. in Exp. Sta. Rec. 37: 868. Feb. 28, 1918.

1210. GOODALE, H. D. **The feminization of male birds.** Jour. Amer. Assoc. Instr. and Invest. Poultry Husb. 3: 68–70. 1917.—Abst. in Exp. Sta. Rec. 38: 275. April 22, 1918.

1211. GOODALE, HUBERT D. **Feminized male birds.** Genetics 3: 276–299. *2 pl.* May, 1918.—Brown Leghorn cockerels were castrated and ovarian tissue engrafted. They developed comb and wattles of feminine character; weight was like that of typical male, much larger than female; spurs were present in male; mating instincts were like those of the male. —Plumage characteristics were of two types,—either (type 1) like typical females in shape, color, barbule arrangement, but with size slightly larger, corresponding with their body size; or (type 2) variable and tending toward black as in male. Type 2 appears incompletely feminized but is considered really due to genetic differences in stock, as blackish hens also appeared.—Feminized cockerel previously described as well as four of 1916 series and two of 1915 series were type 1, while one of 1915 series and two of 1916 series were type 2. 1915 series differed from others in showing no sexual activity.—Implantation of ovarian tissue in ten male birds containing testicular material had no effect on characteristics and the ovarian tissue usually degenerated.—Three feminized Gray Call drakes showed head modified from bright green of male to dull color of female. Feathers of body were of mixed character but upward curl of male tail feathers did not appear. Neck ring of male was absent.—Author suggests that each character may be considered separately after manner of a Mendelian unit. Thus spurs appear in normal males, capons, feminized males, ovariotomized females, and in

females of certain strains of poultry. Control exerted by ovarian secretion is in this respect therefore slight.—Comb and wattle character is determined by type of gonad present. In capons and many ovariotomized hens they are juvenile; in feminized cocks they are feminine.—Body size in ovariotomized hen is small like that of normal hen. Capon is larger than male. Feminized cockerel is size of normal male. Ovary has no influence on body size since castrated females have body size of intact females, while feminized cockerels have body size of male.—Feminized males are masculine in mating instinct while capons are simply reflex. Capons possess brooding instinct, but this is sometimes present in normal cocks. Castrated hens are neutral or masculine in behavior.—Capons have very long feathers thus showing intensified male characteristic, but this may be correlated with greater body size. Feminized males have plumage shape like that of females, showing that ovary controls this character. In color castrated females are like males, while feminized males are like females; capons are like males; ovary therefore controls color.—Gonadial secretions are probably not simple, since their effects are diverse. Secondary sexual characters may depend upon "recessive" sex-linked factors. ["Recessive" here evidently means semipotent, for recessive sex-linked factors find expression in both sexes.]—*P. W. Whiting.*

1212. Goodman, C. W. **Selecting and testing seed corn.** Texas Dept. Agric. Bull. 53 *23 p., 10 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 739. June, 1918.

1213. Gowen, John W. **Studies in inheritance of certain characters of crosses between dairy and beef breeds of cattle.** Jour. Agric. Res. 15: 1–58, *6 pl.* Oct., 1918.—Preliminary paper, Mendelian study based on 48 F_1 and 8 F_2 individuals from crosses involving Ayreshire, Guernsey, Jersey, Holstein-Friesian, and Aberdeen-Angus breeds. Individual records of each animal are given. Results suggest dominance of black body color to other colors, of pigmented muzzle to unpigmented, pigmented tongue to unpigmented, black switch to other switch colors. White in inguinal region appears to be dominant, but white on face, neck, shoulders, rump, flanks, and legs appears to be recessive to self-color. Polled is generally dominant to horned, but apparently testicular hormones influence results, for male heterozygotes are much more likely to show spurs or even horns than female heterozygotes, somewhat similar to cases in sheep. Beef conformation appears in F_1 in head and fore quarters, but rather marked dairy type is seen in body and hind quarters. High milk production appears dominant, but high butter-fat percentage appears recessive.—*J. A. Detlefsen.*

1214. Grantham, A. E. **The relation of cob to other ear characters in corn.** Jour. Amer. Soc. Agron. 9: 201–217. *1 pl.* 1917.—Abst. in Exp. Sta. Rec. 38: 532. June 14, 1918.

1215. Grier, N. M. **Sexual dimorphism and variation in Ginkgo biloba.** Torreya 17: 225. 1917.—[See Bot. Absts. 1, Entry 1327.] Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1216. Haecker, Valentin. **Entwicklungsgeschichtliche Eigenschaftsanalyse (Phänogenetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre. [Developmental analysis of characters (phenogenetics). General problems of development, heredity and eugenics.]** *8 vo., 344 p., 181 fig.* G. Fischer: Jena, 1918.—Contents freely translated from publisher's announcement in Zoöl. Jahrb. 41: cover p. 2. 1918: (1) Problems of character analysis or racial analysis. (2) Developmental analysis of characters in unicellular organisms. (3) Size differences. (4) Asymmetry. (5) Hair, feathers and similar ectodermal structures. (6) General consideration of pigmentation. The ferment-chromogen hypothesis. (7) Color races of the Axolotl and mammals. (8) Color races of birds. (9) Color races of plants. (10) Albinism and albinoidism. (11) Partial albinism, variegation and distinctive markings ["Abzeichen"]. (12) Tiger-striping, dappling, tiger-flecking, luster. (13) White variegation in birds, lower vertebrates and plants. (14) Wild color pattern. (15) Views held hitherto concerning the causes of color pattern. (16) Color pattern and the growth of the skin. (17) Color pattern and skin growth in Axolotl. (18) Application of skin-growth hypothesis to special cases. (19) Color pattern of birds. (20) Abnormalities of the extremities and tail. (21) Combs, horns, antlers. (22) Form of cranium and type of

face. (23) A developmental law of heredity. (24) Developmental analysis of science, the science of the hereditary constitution, and ethnology. (25) Developmental rule of inheritance, and pluripotency.

1217. Hallquist, Carl. **Ein neuer Fall von Dimerie bei Brassica Napus. [A new case of dimery in Brassica napus.]** Bot. Notiser **1916**: 39–42. 1916.—Rev. by Richard Freudenberg in Zeitschr. indukt. Abstamm. Vererb. **19**: 222. June, 1918.

1218. Hallquist, Carl. **Brassicakreuzungen. [Brassica crosses.]** Bot. Notiser **1915**: 97–112. 1915.—Rev. by Richard Freudenberg in Zeitschr. indukt. Abstamm. Vererb. **19**: 221–222. June, 1918.

1219. Hance, R. T. **An attempt to modify the germ plasm of Oenothera through the germinating seed.** Amer. Nat. **51**: 567–572. 1917.—Abst. in Exp. Sta. Rec. **39**: 30. July, 1918.

1220. Hance, Robert T. **Variations in the number of somatic chromosomes in Oenothera scintillans de Vries.** Genetics **3**: 225–275. *7 pl., 5 fig.* May, 1918.—See Bot. Absts. 2, Entry 410.

1221. Harland, S. C. **On the inheritance of the number of teeth in the bracts of Gossypium.** West Indian Bull. **16**: 111–120. *4 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 532–533. June 14, 1918.

1222. Harris, J. A. **Biometric studies on the somatic and genetic physiology of the sugar beet.** Amer. Nat. **51**: 507–512. 1917.—Abst. in Exp. Sta. Rec. **38**: 729. June, 1918.

1223. Harris, J. Arthur. **Further illustrations of the applicability of a coefficient measuring the correlation between a variable and the deviation of a dependent variable from its probable value.** Genetics **3**: 328–352. July, 1918.

1224. Harris, J. A. **Further studies on the relationship between bilateral asymmetry and fertility and fecundity in the unilocular fruit.** Genetics **2**: 186–204. *3 fig.* 1917. [See Bot. Absts. 1, Entry 885.]—Abst. in Exp. Sta. Rec. **38**: 29. Jan., 1918.

1225. Harris, J. A. **On the applicability of Pearson's biserial r to the problem of asymmetry and fertility in the unilocular fruit.** Genetics **2**: 205–212. *1 fig.* 1917. [See Bot. Absts. 1, Entry 887.]—Abst. in Exp. Sta. Rec. **38**: 29. Jan., 1918.

1226. Harris, J. A. **Supplementary determinations of the relationship between the number of ovules per pod and fertility in Phaseolus.** Genetics **2**: 282–290. *2 fig.* 1917. [See Bot. Absts. 1, Entry 886.]—Abst. in Exp. Sta. Rec. **38**: 29. Jan., 1918.

1227. Harris, J. A., A. F. Blakeslee, and D. E. Warner. **The correlation between body pigmentation and egg production in the domestic fowl.** Genetics **2**: 36–77. *16 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 276. April 22, 1918.

1228. Hawkes, Onera A. Merritt. **Studies in inheritance in the hybrid Philosamia (Attacus) ricini (Boisdo.) ♂ × Philosamia cynthia (Drury) ♀.** Jour. Genetics **7**: 135–154. *1 pl., 2 fig.* 1918. [See Bot. Absts. 1, Entry 31.]—Abst. in Jour. Roy. Microsc. Soc. **1918**: 191, June, 1918.

1229. Hays, Frank A. **The influence of excessive sexual activity of male rabbits. II. On the nature of their offspring.** Jour. Exp. Zoöl. **25**: 571–613. April, 1918. [See Bot. Absts. 1, Entry 224.]—Abst. by J. Arthur Thomson in Jour. Roy Microsc. Soc. **1918**: 297–298. Sept., 1918.

1230. Hill, Arthur W. **The history of Primula malacoides, Franchet, under cultivation.** Jour. Genetics **7**: 193–198. *1 fig., 2 pl.* May, 1918.

1231. Hilson, G. R., and F. R. Parnell. **A simple method of selfing cotton.** Madras Agric. Dept. Yearbook 1917: 54, 55. 1917.—Abst. in Exp. Sta. Rec. 39: 234. Nov. 15, 1918.

1232. Hines, C. W. **Seedling cane.** Philippine Agric. Rev. 10: 32–42, *5 pl., 1 fig.* 1917.—Abst. in Exp. Sta. Rec. 39: 237. Nov. 15, 1918.

1233. Honing, J. A. **Selection experiments with Deli tobacco.** Meded. Deli-Proefstat. Medan, 10: 79–128. 1917.—Abst. in Exp. Sta. Rec. 38: 741. June, 1918.

1234. Honing, J. A. **Variabiliteit der bastardsplitsing. (Variabilität der Bastardspaltung). [Variability of hybrid splitting.]** Verslagen gew. verg. Kon. Akad. Wet. Amsterdam, Wis- en Natuurk. Afdeeling 25: 794–805. Nov., 1916.—Rev. by M. J. Sirks in Zeitschr. indukt. Abstamm. Vererb. 19: 204–205. June, 1918.

1235. Hutcheson, T. B., and T. K. Wolfe. **The effect of hybridization on maturity and yield in corn.** Virginia Agric. Exp. Sta. Tech. Bull. 18: 161–170. 1917.—Abst. in Exp. Sta. Rec. 39: 31. July, 1918.

1236. Ibsen, H. L., and E. Steigleder. **Evidence for the death in utero of the homozygous yellow mouse.** Amer. Nat. 51: 740–752. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 573. June 14, 1918.

1237. Ikeno, S. **Studies on the hybrids of Capsicum annuum. II. On some variegated races.** Jour. Genetics 6: 201–229. *1 pl., 2 fig.* 1917.—Abst. in Exp. Sta. Rec. 39: 123. Aug. 1918.

1238. Ikeno, S. **A note on some variegated races of Capsicum annuum.** Jour. Genetics 6: 315–316. 1917. [See Bot. Absts. 1, Entry 900.]—Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1239. Ikeno, S. **Variegation in Plantago.** Genetics 2: 390–416. *2 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 731. June, 1918.

1240. Jackson, S. **"Rogues" among potatoes.** Gard. Chron. 64: 210. Nov. 23, 1918.

1241. Jackson, S., and A. W. Sutton. **"Rogues" among potatoes.** Gard. Chron. 64: 162–163. Oct. 19, 1918.—Two letters dealing with supposed "sport" from Sharpe's Victor potato grown by first author, authenticity of which is doubted by second author. [See Bot. Absts. 1, Entry 944.] Latter urges necessity of making sure that no contamination of culture has taken place, before accepting aberrant form as bud-sport of variety with which it has grown.—*Richard Wellington.*

1242. Jeffrey, Edward C. **Evolution by hybridization.** Mem. Brooklyn Bot. Gard. 1: 298–305. *1 pl.* July, 1918.—Brief résumé and discussion of importance of hybridization factor in plant evolution. Pollen sterility, under normal growth conditions, indicative not of mutability, but of hybridization. Evidence from systematic, phytogeographic and morphological studies shows crossing of species in nature an extremely common cause of species multiplication. Physiological and genetical criteria must not be given greater weight than the more reliable historical (paleobotanical) and morphological criteria in speculations regarding origin of species. Evidence from Oenotheras not suited to furnish decisive proof for de Vries's mutation theory. Multiplication of species by hybridization does not invalidate Darwin's hypothesis, but merely supplies an additional species-forming agent. Hybridization not universal cause for origin of new species, as maintained by Lotsy. Original species must have arisen in some other manner. Adaptation of floral structures to cross-fertilization important from standpoint of frequency of natural hybrids.—*O. E. White.*

1243. Jennings, H. S. **The numerical results of diverse systems of breeding.** Genetics 1: 53–89. 1916.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 205. June, 1918.

1244. Johannsen, W. **Tilsyneladende arvelig Selektionsvirkning. (Scheinbare erbliche Selektionswirkung. [Apparently hereditary effect of selection.]** Overs. over d. kgl. danske Videnskabernes Selskabs Forhandlinger 1915.' 1915.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 217–218. June, 1918.

1245. Jones, D. F. **Dominance of linked factors as a means of accounting for heterosis.** Genetics 2: 466–479. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 367. Mar., 1918.

1246. Jones, J. M. **Sheep breeding and feeding.** Texas Sta. Bull. 205. *24 p., 5 fig.* 1917 —Abst. in Exp. Sta. Rec. 37: 866. Feb. 28, 1918.

1247. Jones, L. R. **Disease resistance in cabbage.** Proc. National Acad. Sci. U. S. Amer. 4: 42–46. 1918.—Abst. by F. K[idd] in Physiol. Absts. 3: 305. July-Aug., 1918. [See Bot. Absts. 1, Entry 321.]

1248. Kapteyn, J. C. **Skew frequency curves in biology and statistics.** Recueil Trav. bot. Néerl. 13: 105–157. 1916.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. 19: 205–206. June, 1918.

1249. Kent, O. B. **How to select laying hens.** New York State Coll. Agric. Cornell Univ. Ext. Bull. 21. *P. 23–33, 5 pl., 9 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 775. June, 1918.

1250. Kezer, Alvin, and Breeze Boyack. **Mendelian inheritance in wheat and barley crosses with probable error studies on class frequencies.** Colorado Agric. Exp. Sta. Bull. 249. *139 p., 9 pl., 10 fig.* Oct., 1918.—See Bot. Absts. 2, Entry 682.

1251. Kirkham, W. B. **Embryology of the yellow mouse.** Anat. Rec. 11: 480–481. 1917. —Abst. in Exp. Sta. Rec. 38: 573. June 14, 1918.

1252. Kranichfeld, H. **Die Einwände Heribert Nilsson's gegen die Mutationslehre von H. de Vries. [Heribert-Nilsson's criticisms of the mutation theory of H. de Vries.]** Biol. Zentralbl. 37: 61–98. 1917.—German Abst. in Zeitschr. Pflanzenzüchtung 6: 52. Mar., 1918.

1253. Kraussé, A. **Polydaktylie auf Sardinien. [Polydactyly in Sardinia.]** Die Naturwiss. 4: 723. 1916.—Rev. by Hermann W. Siemens in Zeitschr. indukt Abstamm. Vererb. 19: 207–208. June, 1918.

1254. Lamon, H. M. **Value of breeding from selected stock.** Jour. Massachusetts Poultry Soc. 1: 15–16, 24, 30–32. 1917.—Abst. in Exp. Sta. Rec. 38: 775. June, 1918.

1255. Lancefield, D. E. **An autosomal bristle modifier, affecting a sex-linked character.** Amer. Nat. 52: 462–464. Aug.-Sept., 1918.—A recessive modifying gene in third chromosome of *Drosophila melanogaster* affects dominance of sex-linked bristle character (forked) which is ordinarily completely recessive. Females heterozygous for forked, homozygous for this third-chromosome modifier, will exhibit forked bristle character to limited extent. The third chromosome gene produces no visible effect in flies not heterozygous for forked.—*C. B. Bridges.*

1256. Lancefield, D. E. **A case of abnormal inheritance in Drosophila melanogaster.** Amer. Nat. 52: 556–558. Oct.-Nov., 1918.—Author reports aberrant inheritance of sex-linked genes of Drosophila. Progeny tests gave three aberrant cultures but further tests gave entirely normal results. Data obtained were insufficient for analysis.—*C. B. Bridges.*

1257. Lehmann, Ernst. **Variabilität und Blütenmorphologie. [Variability and floral morphology.]** Biol. Zentralbl. 38: 1–38. Jan., 1918.

1258. LENZ, DR. FRITZ. **Eine Erklärung des Schwankens der Knabenziffer.** [An explanation of the decrease in number of boys.] Archiv. Rassen- u. Gesellschaftsbiol. 11: 629. 1914–15.—Rev. by Hermann W. Siemans in Zeitschr. indukt. Abstamm. Vererb. 19: 208–209. June, 1918.

1259. LEWIS, H. R. **Selection: The basis of improving the poultry flock.** New Jersey State Hints to Poultrymen 5: 1–4. 1917.—Abst. in Exp. Sta. Rec. 37: 871. Feb. 28, 1918.

1260. LILLIE, FRANK R. **The free-martin, a study of the action of sex hormones in the foetal life of cattle.** Jour. Exp. Zoöl. 23: 371–452. *29 fig.* 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 37. Mar., 1918.

1261. LOEB, J. **Further experiments on the sex of parthenogenetic frogs.** Proc. Nation. Acad. Sci. U. S. Amer. 4: 60–62. 1918.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 290. Sept., 1918. Physiol. Absts. 3: 328. Sept. 1918. [See Bot. Absts. 1, Entry 912.]

1262. LOTSY, J. P. **Oenothera Lamarckiana considered as a nuclear chimera.** Arch. Néerland. Sci. Exact et Nat. III, 3: 324–350. *6 pl.* 1917.—Abst. in Exp. Sta. Rec. 39: 226. 1918.

1263. LOVE, H. H., AND A. C. FRASER. **The inheritance of the weak awn in certain Avena crosses.** Amer. Nat. 51: 481–493. *2 fig.* 1917.—Abst. in Exp. Sta. Rec. 39: 234–235. 1918.

1264. LOVE, H. H., AND G. P. MCROSTIE. **The inheritance of hull-lessness in oat hybrids.** Amer. Nat. 53: 5–32. *7 fig.* Jan.–Feb., 1919.—See Bot. Absts. 2, Entry 420.

1265. MCEWEN, R. S. **The reactions to light and to gravity in Drosophila and its mutants.** Jour. Exp. Zoöl. 25: 49–106. *3 fig.* 1918.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 303–304. Sept., 1918.

1266. MACINNES, L. T. **The testing of pure-bred cows in New South Wales.** Jour. Heredity 9: 307, 335. Nov., 1918.

1267. MACLEOD, J. **Quantitative description of ten British species of genus Mnium.** Jour. Linn. Soc. 44: 1–58. *9 fig.* 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 69. Mar., 1918.

1268. MALINOWSKI, E. **Über die durch Kreuzung hervorgerufene Vielförmigkeit beim Weizen.** [On the variability of wheat induced by crossing.] Ext. C. R. Soc. Sci. Varsovie 9: 733–756. 1916.—Rev. by E. Schiemann in Zeitschr. indukt. Abstamm. Vererb. 19: 219. June, 1918.

1269. MALINOWSKI, E. **On the inheritance of some characters in the radishes.** Ext. C. R. Soc. Sci. Varsovie 9: 757–776. *1 pl.* 1916.—Rev. by E. Schiemann in Zeitschr. indukt. Abstamm. Vererb. 19: 223. June, 1918.

1270. METZ, CHARLES W. **Chromosome studies on the Diptera. 2. The paired association of chromosomes in the Diptera, and its significance.** Jour. Exp. Zool. 21: 213–280. *8 pl.* 1916. [See next following Entry, 1271.]

1271. METZ, CHARLES W. **Chromosome studies on the Diptera. 3. Additional types of chromosome groups in the Drosophilidae.** Amer. Nat. 50: 587–599. *1 pl.* 1916. This and next preceding Entry, 1270, rev. by Harry Federley in Zeitschr. indukt. Abstamm. Vererb. 19: 211–213. June, 1918.

1272. MORGAN, T. H. **The theory of the gene.** Amer. Nat. 51: 513–544. *12 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 65. Jan., 1918.

1273. Morgan, T. H. **Inheritance of number of feathers of the fantail pigeon.** Amer. Nat. 52: 5-27. *14 fig.* 1918.—Abst. in Jour. Roy. Microsc. Soc. 1918: 181. June, 1918. [See Bot. Absts. 1, Entry 39.]

1274. Murphy, Miss L. **Fourth Irish egg-laying competition, 1915-16. Supplementary report on the noncompeting pens, with some notes on the breeding of Rhode Island Reds for egg production.** Jour. Dept. Agric. and Tech. Instr. Ireland 17: 280-289. 1917.—Abst. in Exp. Sta. Rec. 38: 172-173. Feb., 1918.

1275. Ness, H. **Hybrids of the live oak and overcup oak.** Jour. Heredity 9: 263-268. *Fig. 6-8.* Oct., 1918.—Author crossed live oak (*Quercus virginiana*) with overcup oak (*Q. lyrata*). These species ripen their acorns at same time and are of same genus but differ widely in systematic characters. Cross was easily effected and resulting hybrids made growth of about 16 feet in eight years. Two lots of hybrids were secured, all of which are very uniform and vigorous. *Q. lyrata* type of tree is dominant. Leaves are very uniform but intermediate in size and somewhat in shape, with *lyrata* type slightly more pronounced. Live oak dominates in fruit except in size, which is intermediate. Bark resembles that of *lyrata*. Hybrid is superior to parents as an ornamental because of superior form, density, and luster of foliage. One F_2 plant has been obtained. Its stem is shorter-jointed than that of F_1; leaves similar to those of F_1. Author has been unable to cross *Q. nigra* with *Q. virginiana*. Natural hybrid, *Q. lyrata-virginiana*, is quite common in Mississippi, Louisiana, Alabama and Texas. Artificially produced hybrid closely resembles wild hybrids.—*C. E. Myers.*

1276. Newman, H. H. **The biology of twins.** *ix + 186 p., 1 pl. 55 fig.* Chicago Univ. Press: Chicago, 1917.—Abst. in Exp. Sta. Rec. 38: 574. June 14, 1918.

1277. Niewland, J. A. **Teratological notes.** Amer. Midl. Nat. 5: 231. 1918.

1278. Onslow, H. **A contribution to our knowledge of the chemistry of coat colour in animals and of dominant and recessive whiteness.** Proc. Roy. Soc. London 89: 36-58. 1915. —Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. 19: 211. June, 1918.

1279. Osborn, H. F. **Biocharacters as separable units of organic structure.** Amer. Nat. 51: 449-456. 1917.—Abst. in Exp. Sta. Rec. 38: 823. Aug. 9, 1918.

1280. Pearson, K., and A. W. Young. **On the product-moments of various orders of the normal correlation surface of two variables.** Biometrika 12: 86-92. Nov., 1918. See Bot. Absts. 2, Entry 697.

1281. Pellew, Caroline. **Types of segregation.** Jour. Genetics 6: 317-339. *1 pl.* 1917. —Abst. in Exp. Sta. Rec. 39: 123. Aug., 1918.

1282. Pellew, Caroline, and Florence M. Durham. **The genetic behaviour of the hybrid Primula Kewensis, and its allies.** Jour. Genetics 5: 1916.—Rev. by Tage Ellinger in Zeitschr. indukt. Abstamm. Vererb. 19: 219. June, 1918.

1283. Philiptschenko, I. **Observations on the skulls of hybrids between wild and domestic horses and cattle.** Compt. Rend. Soc. Biol. [Paris] 78: 636-638. 1915.—Abst. in Exp. Sta. Rec. 38: 65. Jan., 1918.

1284. Plate, L. **Vererbungsstudien an Mäusen.** [Inheritance studies on mice.] Arch. Entw.-Mech. Organ. 44: 291-336. *5 fig.* 1918.

1285. Plough, Harold H. **The effect of temperature on crossing over in Drosophila.** Jour. Exp. Zool. 24: 147-209. *9 fig.* 1917.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 303. Sept., 1918.

1286. Punnett, Reginald Crundall. **Mimicry in butterflies.** *188 p., 16 pl.* Cambridge Univ. Press: Cambridge, England. 1915.—Rev. by Harry Federley in Zeitschr. indukt. Abstamm. Vererb. 19: 213–215. June, 1918.

1287. Richards, Mildred Hoge. **Two new eye colors in the third chromosome of Drosophila melanogaster.** Biol. Bull. 35: 199–206. Oct. 1918.—During a temperature experiment with *Drosophila melanogaster*, a recessive mutant eye color, scarlet, appeared. Its gene lies in third chromosome (3.8 as calculated from the data) to left of dichaete. Appearance of mutant character is almost identical with older mutant, vermilion, of first chromosome. An independent origin of "scarlet" has been recently reported by Lancefield [See Bot. Absts. 1, Entry 1527.] Another recessive mutant eye color, rose, appeared in same experiment.—*C. B. Bridges.*

1288. Robertson, W. R. B. **A mule and a horse as twins, and the inheritance of twinning.** Kansas Univ. Sci. Bull. 10: 293–298. *4 pl.* 1917.—Abst. in Exp. Sta. Rec. 38: 574. June 14, 1918.

1289. Rosen, D. **Zur Theorie des Mendelismus. 1. Über scheinbare Koppelungs- und Abstossungs-phänomene bei gewissen polymeren Spaltungen. 2. Über den analytischen Wert von Ruckkreuzungen. [On the theory of Mendelism. 1. On apparent coupling—and repulsion—phenomena in certain polymeric segregations. 2. On the analytical value of back crossing.** Bot. Notiser 1916: 289–298. 1916—Rev. by Rasmuson in Zeitschr. indukt. Abstamm. Vererb. 19: 207. June, 1918.

1290. Schmidt, J. **Investigations on hops. X. On the aroma in plants raised by crossing.** Compt. Rend. Trav. Lab. Carlsberg 11: 330–332. 1917.—Abst. in Exp. Sta. Rec. 39: 234. 1918.

1291. Semon, Richard. **Die Fusssohle des Menschen. [The footsole of man.]** Arch. mikrosk. Anat. 82: 164–211. 1913.—Rev. by Hermann W. Siemens in Zeitschr. indukt. Abstamm. Vererb. 19: 209–210. June, 1918.

1292. Shamel, A. D. **A dry blood-orange strain.** Jour. Heredity 9: 174–177. *2 fig.* Apr., 1918.—Abst. in Exp. Sta. Rec. 39: 142. Aug., 1918. [See Bot. Absts. 1, Entry 45.]

1293. Shamel, A. D. **Striking orange bud variations.** Jour. Heredity 9: 189–191. *2 fig.* 1918.—Abst. in Exp. Sta. Rec. 39: 142. Aug., 1918. [See Bot. Absts. 1, Entry 46.]

1294. Shamel, A. D. **Why navel oranges are seedless.** Jour. Heredity 9: 246–249. Oct., 1918.—Fruits of Washington navel oranges are seedless because anthers do not develop pollen. When pollinated by other varieties, as Valencia, navel bears viable seeds. A very few specimens bearing seeds have been found in crops from performance-record trees, but this is attributed to accidental transfer of pollen by bees. Appearance of navels in the Ruby Blood variety is commonly attributed to cross-pollination with navel, but in reality these navels are true bud variations which occur in varying degrees on Ruby Blood variety.—A seedy strain of navel was discovered in 1910. In this anthers develop viable pollen which falls on stigma before petals open. Subsequently fecundation takes place.—*C. E. Myers.*

1295. Shamel, A. D. **Lemon orchard from buds of single selected tree.** Jour. Heredity 9: 319–320. *Fig. 11.* Nov., 1918.

1296. Shamel, A. D., and C. S. Pomeroy. **A fruiting orange thorn.** Jour. Heredity 9: 315–318. *Fig. 8–10.* Nov., 1918.

1297. Shore-Bailey, W. **Hybrid Wigeon.** Avic. Mag. 10: 15–16. *1 pl.* Nov., 1918.—Hybrids between Chili ♂ (*Mareca sibilatrix*) × English Wigeon ♀ (*N. penelope*) are said to resemble very closely the American Wigeon or Baldpate (*M. americana*), and author suggests possibility of the American species having arisen as a cross. Five hybrids reared were all drakes. Photograph of two in accompanying plate.—*L. J. Cole.*

1298. SHULL, A. F. **Sex determination in Anthothrips verbasci.** Genetics 2: 480–488. 1917.—Abst. in Exp. Sta. Rec. 38: 558. June 14, 1918.

1299. SHULL, A. FRANKLIN. **Genetic relations of the winged and wingless forms to each other and to the sexes in the aphid Macrosiphum solanifolii.** Amer. Nat. 52: 507–520. Oct.-Nov., 1918.—Four kinds of individuals observed in species discussed: (1) wingless, viviparous females; (2) winged viviparous females; (3) oviparous, sexual females, which are wingless; (4) males.—Breeding tests with first two types (both parthenogenetic) showed that wingless type produced predominantly winged daughters, and *vice versa*. Also, at onset of production of sexual aphids, it was found that wingless, parthenogenetic females produced predominantly males, while winged ones produced predominantly females.—It was further found (1) that in rearing successive generations of parthenogenetic offspring, the proportion of winged forms steadily increased, though wingless forms were chosen in most cases as breeders; (2) there was a gradual increase in tendency of wingless mothers to produce females instead of males, and perhaps also a decrease in number of males produced by winged mothers.—Author endeavors to view these facts from a common standpoint, especially in relation to Riddle's theory of sex, but believes it doubtful if they can be reconciled with latter.—*F. B. Summer.*

1300. SMITH, KIRSTINE. **On the standard deviations of adjusted and interpolated values of an observed polynomial function and its constants and the guidance they give towards a proper choice of the distribution of observations.** Biometrika 12: 1–85. *9 diagrams.* Nov., 1918.

1301. STAKMAN, E. C., F. J. PIEMEISEL, AND M. N. LEVINE. **Plasticity of biologic forms of Puccinia graminis.** Jour. Agric. Res. 15: 221–250. *Pl. 17–18.* Oct. 28, 1918.—Attempts were made to change different biologic forms of *B. graminis* gradually from one parasitic form into another and to increase their virulence on resistant hosts by means of transferring successively to proper, taxonomically related and unrelated, hosts, so-called bridging species. The facts given do not support conclusions of previous workers that pathogenicity of biologic forms is easily changed by host influence. *Puccinia graminis secalis* which does not attack wheat but does infect barley, cultured continuously for three years on barley and other theoretical bridging hosts (Elymus, Agropyrum, Bromus, etc.) acquired no new parasitic capability on account of its association with barley. Same applies to *P. graminis tritici* in its relations to rye as well as to other forms of Puccinia tried by the authors (*avenae, agrostis, phleipratensis*, etc.). Barberry does not increase host range of these forms nor does it act as reinvigorator of the rust; biologic specialization in aecial stage is apparently same as that in uredineal stage. Different forms of Puccinia, which must be isolated from mixtures by using differential hosts before starting any experiments seem to be roughly analogous to pure lines. Plus and minus fluctuations may occur but there is always tendency to return to normal. Biologic forms may have arisen either by mutations or by gradual process of evolution. These processes may be operative yet, but writers have not been able to detect any mutation nor to induce perceptible evolutionary changes experimentally. Possible rôle of hybridization will be investigated.—*C. A. Gallastegui.*

1302. TAMMES, TINE. **Die gegenseitige Wirkung genotypischer Faktoren. [The antagonistic action of genotypic factors.]** Rec. Trav. bot. Néerland. 13: 1916.—Rev. by Th. Stomps in Zeitschr. indukt., Abstamm. Vererb. 19: 224. June, 1918.

1303. TANAKA, YOSHIMARO. **Genetic studies on the silk worm.** Jour. College Agric., Sapporo 7: 129–255. *Pl. 1–4.* 1916.—Rev. by Harry Federley, Zeitschr. indukt. Abstamm. Vererb. 19: 210. June, 1918.

1304. TAYLOR, GEO. M. **Bud variation in potatoes.** Gard. Chron. 64: 229. Dec. 7, 1918.

1305. TRELEASE, W. **Naming American hybrid oaks.** Science 46: 244. 1917.—Abst. in Exp. Sta. Rec. 37: 820–821. Feb. 28, 1918.

1306. VALLEAU, W. D. **Inheritance of sex in the grape.** Amer. Nat. 50: 554–564. 1916.—Abst. in Exp. Sta. Rec. 39: 242. 1918.

1307. VALLEAU, W. D. **Sterility in the strawberry.** Jour. Agric. Res. 12: 613–670. *6 pl., 4 fig.* Mar., 1918. [See Bot. Absts. 1, Entry 51.]—Abst. in Exp. Sta. Rec. 39: 48–49. July, 1918.

1308. VENKATARAMAN, T. S. **A study of the arrowing (flowering) in the sugar cane with special reference to selfing and crossing operations.** Agric. Jour. India, Indian Sci. Cong. 1917: 97–108. *6 pl.* 1917.—Abst. in Exp. Sta. Rec. 39: 237. 1918.

1309. VON CARON-ELDINGEN. **Die Verbesserung der Getreidearten, veranschaulicht an einer Monographie des Weizens. Neue wissenschaftliche und praktische Erfahrungen für Pflanzenzüchter und Landwirte. [The improvement of the small grains; as exemplified by a monograph of wheat. New scientific and practical experiences for plant breeders and agriculturists.]** *8vo.* Paul Parey: Berlin, 1918.

1310. WALLER, A. E. **Xenia and other influences following fertilization.** Ohio Jour. Sci. 17: 273–284. 1917.—Abst. in Exp. Sta. Rec. 38: 526. June 14, 1918.

1311. WALLER, A., and L. E. THATCHER. **Improved technique in preventing access of stray pollen.** Jour. Amer. Soc. Agron. 9: 191–195. *1 pl.* 1917.—Abst. in Exp. Sta. Rec. 38: 430. April, 1918.

1312. WERBER, E. I. **Experimental studies on the origin of monsters. II. Regarding the morphogenesis of duplicities.** Jour. Exp. Zoöl. 24: 409–443. *27 fig.* 1917.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 291–292. Sept., 1918.

1313. WHITE, O. E. **Inheritance of endosperm color in maize.** Amer. Jour. Bot. 4: 396–406. 1917. Abst. in Exp. Sta. Rec. 38: 226. April 22, 1918. Also *ibid.* 38: 737–738. June, 1918.

1314. WHITE, O. E. **Studies of inheritance in Pisum. II. The present state of knowledge of heredity and variation in peas.** Proc. Amer. Phil. Soc. 56: 487–588. 1917.—Abst. in Exp. Sta. Rec. 38: 822–823. Aug. 9, 1918.

1315. WHITE, O. E. **Inheritance studies in Pisum. IV. Interrelation of the genetic factors of Pisum.** Jour. Agric. Res. 11: 167–190. 1917.—Abst. in Exp. Sta. Rec. 38: 226. April 22, 1918.

1316. WILSON, J. **A manual of Mendelism.** *8 + 152 p., 8 fig.* A. and C. Black: London, 1916.—Abst. in Exp. Sta. Rec. 38: 367. Mar., 1918.

1317. WINKJER, JOEL G. **Coöperative bull associations.** U. S. Dept. Agric. Farmers' Bull. 993. *35 p. 7 fig.* Washington, 1918.—Table shows growth of movement from 3 associations in 1908 to 36 in 1917. Plans for constitution and by-laws are given. Typical association composed of 15 to 30 farmers, territory being divided into "breeding blocks," one bull assigned to each. As many as 50 to 60 cows may belong to farmers of block. Bull kept on farm most conveniently located and moved every two years to next block to prevent inbreeding.—Association in Maryland furnished figures showing marked improvement due to method outlined. Further data not yet available. Two methods given for selection of sire: (1) on basis of daughters' records; (2) bull whose ancestors have good production records. First method preferred but not so widely used because of added cost of purchasing such a bull.—*H. K. Hayes.*

1318. WRIGHT, S. **Color inheritance in mammals. II–V.** Jour. Heredity 8: 373–378, 426–430, 473–475, 476–480. 1917.—Abst. in Exp. Sta. Rec. 38: 776. June, 1918.

1319. Wright, Sewall. **On the nature of size factors.** Genetics 3: 367–374. July, 1918.—Mathematical investigation of data obtained by MacDowell and by Castle upon bone measurements of rabbits giving a method of analyzing the effect of factors upon general size and upon individual characters by means of correlation coefficients with one, two and three characters constant. Data treated in this way show slight indications of brachicephaly being associated with long tibia but short femur. Apparently femur most closely related to general growth, width of skull least. Mode of estimating the relative importance of different kinds of growth factors presented and applied to data which shows most differences between individuals involve size of body as a whole but also certain amount of variation of each bone length independently of all others measured and also groups of bones which vary together independently of rest of body such as skull length and breadth and as three leg bones. Femur and tibia of hind leg form a group subject to common influences which do not affect humerus, a bone of foreleg. Femur and humerus, homologous bones in hind and foreleg, vary together independently of tibia.—*D. F. Jones.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. Sinnott, *Editor.*

[Unsigned abstracts are by the editor.]

THALLOPHYTES

1320. Howe, M. A. **Further notes on the structural dimorphism of sexual and tetrasporic plants in the genus Galaxaura.** Brooklyn Bot. Gard. Mem. 1: 191–197. *Pl. 3–4.* 1918.—Certain subgeneric groups of Kjellman and others in *Galaxaura* have relations to each other similar to those which author has shown to exist between forms of *Galaxaura obtusata.* Evidence is presented that the group *Brachycladia* includes tetrasporic plants, of which the sexual phases are found in group *Vepreculae* and that group Rhodura is made up wholly of tetrasporic plants, differing much in general habit and structure from their sexual alternates, currently placed in sections *Micothoë* and *Eugalaxaura.*—*M. A. Howe.*

1321. Turchini, Jean. **Rôle de l'heterocyste des Nostocées.** [Role of the heterocyst of the Nostocaceae.] Rev. Gén. Bot. 30: 273–282. *Pl. 19.* 1918.—Cytological and microchemical studies based upon 3 species of *Nostoc* and 1 of *Anabaena.* Author thinks that idea put forward by some of the older writers, that heterocyst is food-storage organ with possibilities of germination, may be definitely discarded; the heterocyst, once constituted, being in fact a dead cell with vacuolar protoplasm. He finds that in *Nostoc* heterocyst is connected with adjoining vegetative cells by an isthmus longer and more slender than that connecting any two vegetative cells. Owing to fragility of this isthmus, fragmentation of the filaments into hormogones takes places at heterocyst, so that heterocyst presides at division of filament and contributes, in a way, to dissemination of species.—*M. A. Howe.*

1322. Fitzpatrick, Harry M. **The cytology of Eocronartium musciocola.** Amer. Jour. Bot. 5: 397–419. *Pl. 30–32.* 1918.—*Eocronartium muscicola*, parasitic on mosses, has unusually large nuclei. Cells of mycelium, throughout host, are binucleate, as is also young basidium, but its two nuclei soon fuse and the resulting nucleus passes into resting condition. Synapsis follows and later stages of this division and also of second division show 4 chromosomes, which is the reduced number; since each of the two nuclei of mycelium show a nuclei, making 8 the diploid number. Transverse walls divide basidium into 4 cells, from each of which comes a comparatively large sterigma. Nucleus becomes much attenuated in passing through sterigma into young spore. The centrosome does not seem to be involved in this movement. The origin of binucleate mycelium from uninucleate basidiospore has not yet been determined.—*Charles J. Chamberlain.*

1323. Skupieński, F. X. **Sur la sexualité chez les Champignons Myxomycètes.** [Sexuality in the Myxomycetes. Compt. Rend. Paris 167: 31–33. 1918.—Author presents a brief note upon life history of the myxomycete, *Didymium nigripes*, when grown in single-spore

cultures. Individual spores germinate to zoospores which multiply by division and give rise to myxamoebae which also multiply by division. Ultimately the latter become "gametes" and fuse in pairs to form zygotes which make up plasmodium. Author has succeeded 3 times in starting cultures on sterile media from single isolated myxamoebae and likewise has started cultures twice from single zoospores. In these 5 cases he failed to obtain plasmodia while his original stock culture and the culture secured from an isolated fusion myxamoeba or zygote produced normal plasmodia and fructifications. From observations presented, author concludes that a sexual process exists in *Didimium* in the fusion of (+) and (−) myxamoebae giving rise to zygotes, the aggregation of which forms a plasmodum. Fusion of plasmodia is not considered a sexual process. The species studied is classed as homothallic since a single spore produces both (+) and (−) gametes.—*A. F. Blakeslee.*

SPERMATOPHYTES

1324. ARBER, AGNES. **The Phyllode Theory of the monocotyledonous leaf, with special reference to anatomical evidence.** Ann. Bot. 32: 465–501. *32 fig.* 1918.—Author discusses de Candolle's "Phyllode" theory of the monocotyledonous leaf, (that such a leaf corresponds essentially to petiole of a dicotyledonous leaf), and Henslow's corollary thereto. She shows that in addition to support for this theory derived from external morphology, there is evidence in its favor from anatomy, particularly the occurrence among certain monocotyledons of inverted vascular bundles in the leaf ("phyllodic" structure). The phyllodic anatomy evident in some of the dicotyledons is discussed and anatomical evidence in support of Henslow's corollary brought forward. Phyllodic anatomy is shown to occur among the presumably ancestral monocotyledons—Helobiae, Liliiflorae and Farinosae—and to be absent among the higher forms. It is believed to be an ancestral character, revealing petiolar origin of leaf of monocotyledons. [See Bot. Absts. 1, Entry 1336.]

1325. ARBER, AGNES. **Further notes on intrafascicular cambium in monocotyledons.** Ann. Bot. 32: 87–89. *4 fig.* 1918.—Abst. by J. M. Coulter in Bot. Gaz. 66: 288. 1918. [See Bot. Absts. 1, Entry 61.]

1326. FULLER, GEO. D. **Ecological anatomy of leaves.** Bot. Gaz. 65: 487–488. 1918. [Review of: HANSON HERBERT C. **Leaf structure as related to environment.** Amer. Jour. Bot. 4: 533–560. *21 fig.* 1917.]—Effect of differences in various environmental factors (light, evaporating power of air, temperature, humidity and wind velocity) upon structure of leaves and upon their transpiration was studied for a number of species of trees. A wide range of variation in environment and in leaf character was noted in different parts of the leafy crown. Reviewer regards this investigation as particularly important in opening up a promising field in the study of structural response of aerial organs to measured variations in external factors. [See Bot. Absts. 1, Entry 1328.]

1327. GRIER, N. M. **Sexual dimorphism and variation in Ginkgo biloba.** Torreya 17: 225. 1917.—There seems to be a correlation between the sex of this tree and its growth habit and the shape of its leaves. [Through Abst. in Exp. Sta. Rec. 39: 124. 1918.] [See Bot. Absts. 1, Entry 1215.]

1328. HANSON, H. C. **Leaf structure as related to environment.** Amer. Jour. Bot. 4: 533–560. *21 fig.* 1917.—Abst. in Exp. Sta. Rec. 39: 29. 1918. [See Bot. Absts. 1, Entry 1326.]

1329. HEILBORN, OTTO. **Zur Embryologie und Zytologie einiger Carex-Arten. Embryology and Cytylogy of some species of Carex.** Svensk. Botanisk Tidskrift 12: 212–220. *14 fig.* 1918.—Oogenesis and spermatogenesis were studied in several species of *Carex*. Gametophyte number of chromosomes is as follows: *C. pilulifera*, 8; *C. ericlorum*, 16; *C. digitata*, 24; *C. caryophyllea* and *C. flava*, 32. Juel had found 52 in *C. Acuta*, and Stout 37 in *C. aquatilis*. *C. pilulifera* has the largest chromosomes, and in species with more numerous chromosomes, the chromosomes are correspondingly smaller. Attempts to cross various species have not yet proved successful, but work is still in progress.—*C. J. Chamberlain.*

1330. Holden, H. S., and Dorothy Bexon. **Observations on the anatomy of teratological seedlings. 1. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. Bot. 32: 513–530. *17 fig.* 1918.—A series of seedlings of this species exhibiting cotyledonary abnormalities ranging from hemitricotyly to tetracotyly were studied, with particular reference to the methods by which cotyledonary increase takes place. Evidence from vascular anatomy indicates that such increase may arise from (1) cotyledonary fission, (2) dichotomy of the growing point of cotyledon, and, more doubtfully, (3) by the downward displacement of one or more epicotyledonary leaves. Previous work on schizocotyly, particularly that of Hill and de Fraine and Compton, is shown to be capable of interpretation on this basis and to present illustrations of these three types of increase.

1331. Klienebergeb, Emmy. **Ueber die Grösse und Beschaffenheit der Zellkerne mit besonderer Berücksichtigung der Systematik. The size and character of nuclei, with special regard to taxonomy.** Beih. Bot. Centralbl. 35: 219–278. 1918.—Measurements are given of size of nucleus in various tissues of about 100 species of monocotyledons. Nuclear size is more or less constant for a given tissue or organ of a given species. Nuclei of most monocotyledons are not large. Scitamineae, Juncaceae, Cyperaceae, Gramineae and Bromeliaceae all have small nuclei, as do part of the Liliaceae, Amaryllidaceae and Convallariaceae. The remainder of last named families and the Iridaceae are the only ones which appear to have large nuclei.—*C. H. Farr.*

1332. Markle, M. S. **Root systems of certain desert plants.** Bot. Gaz. 64: 177–205. *33 fig.* 1917.—A study of root systems in region near Albuquerque, New Mexico [Abst. in Exp. Sta. Rec. 39: 29. 1918.]

1333. Record, S. J. **Significance of resinous tracheids.** Bot. Gaz. 66: 61–67. *5 fig.* 1918.—Abst. in Exp. Sta. Rec. 39: 451. 1918. [See Bot. Absts. 1, Entry 275.]

1334. Record, S. J. **Intercellular canals in dicotyledonous woods.** Jour. Forestry 16: 429–441. *8 fig.* 1918.—Abst. in Exp. Sta. Rec. 39: 145. 1918. Also rev. by J. M. Coulter in Bot. Gaz. 66: 543. 1918. [See Bot. Absts. 1, Entries 260, 989.]

1335. Seward, A. C. **Plant anatomy in relation to evolution.** Nature 100: 502–503. Feb. 28, 1918. [Review of: E. C. Jeffrey. **The anatomy of woody plants.** x + 478 p. Univ. of Chicago Press. 1917.]—After summing up contents of the various chapters, author criticizes severely the method of treatment and the scope of book. He calls it "an original and stimulating contribution to botanical literature" but "not a comprehensive text-book," finds "the treatment essentially eclectic and the subject matter to a large extent limited by the scope of the author's researches." That there are no references to published work of other authors and no bibliography he believes a very serious blemish in a book presumably intended for students. He concludes, "The fact that Professor Jeffrey is an original investigator whose position entitles him to speak with authority increases one's regret that his attitude is not more in keeping with the best traditions of scientific exposition." [See Bot. Absts. 1, Entry 986.]—*F. Grace Smith.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

[Unsigned abstracts are by the editor.]

1336. Arber, Agnes. **The phyllode theory of the monocotyledonous leaf, with special reference to anatomical evidence.** Ann. Bot. 32: 465–501. *32 fig.* Oct. 1918.—The results of an extended examination of anatomical details in a large number of types are considered as supporting the phyllode nature of the leaves in the Monocotyledons. The presence of inverted bundles on the adaxial side is taken to indicate such a phyllodic nature. Phyllodic anatomy as thus interpreted is found to be most widely known in the Helobiales and Lil-

liales. In monocotyledons with differentiated petiole and blade the latter is suggested as having been evolved as an expanded apical portion of a phyllode and is therefore a pseudolamina and not strictly comparable with the lamina of a dicotyledonous leaf. The discussion is full and the author gives lists of genera showing phyllodic anatomy. She believes that the Monocotyledonae are monophyletic and derived from dicotyledonous-like ancestors, and considers the geophilous theory of Sargent as more in harmony with the facts than the hydrophilous theory, so-called. Granting that the premises are well taken it is an interesting commentary on the monophyletic hypothesis that no members of the orders Pandanales, Poales, Palmales, Triuridales, Synanthales, Scitaminales, or Arales except Acorus, have been shown to exhibit traces of phyllodic anatomy.

1337. Benson, Margaret I. **Mazocarpon or the structure of Sigillariostrobus.** Ann. Bot. 32: 569–589. *4 fig., pls. 17, 18.* Oct., 1918.—*Mazocarpon* is a form genus for structural remains of sporangia or sporophylls of a *Lepidophyte* type of remarkable interest since the sporangium is filled with continuous tissue the bulk of which is sterile and may in part represent the sporangiophore of the Arthrophyta. The new material studied shows that these sporophylls were borne on pedunculate cones several inches in length and half an inch in diameter, with close set spiral caducous sporophylls of the *Lepidostrobus* type. The megaspores were reduced in number and germinated in situ. The author concludes that the seed habit is approached in two ways (1) in that the megaspore germinated within the sporangium (2) in that the sporangium underwent a certain amount of vegetative development. Fertilization is regarded as having been impossible until fragmentation of the sporangium had taken place owing to the centroscopically directed archegonia. Each prothallus is believed to have normally retained a portion of this nucellar tissue by means of its toothed wall and thus several theoretically seed-like bodies were produced from one sporangium. The structures described in detail may be open to more than a single interpretation, but the author has demonstrated beyond reasonable cavil, that *Mazocarpon* probably represents structural material of cones of the Sigillariaceae—a fact of far reaching importance and interest. Botanists are well acquainted with the cones of the Lepidodendraceae (*Lepidostrobus*) but those of the allied family Sigillariaceae have only been known as the impressions described by Zeiller, Kidston and others under the name of *Sigillariostrobus*. The identity of *Mazocarpon* and *Sigillariostrobus* rests on the intimate association of *Mazocarpon* with leaves bark and denuded cone axes of *Sigillaria*, on detailed comparisons between the structural and impression material and the exact agreement in all of the features that could be compared. Three species of *Mazocarpon* are characterized showing a time range from the Lower Carboniferous through the Upper Carboniferous. A relationship is claimed between *Sigillaria* and the lower Triassic genus *Pleuromoia*, one that most botanists will subscribe to, and much is made of the morphological similarities between *Mazocarpon* and the modern species of *Isoetes*, a suggested relationship that has received rather wide acceptance in the past.

1338. Hollick, A. **Some botanical problems that paleobotany has helped to solve.** Mem. Brooklyn Bot. Gard. 1: 187–190. July, 1918.

1339. Jeffrey, E. C. **Evolution by hybridization.** Mem. Brooklyn Bot. Gard. 1: 298–305. *Pl. 5.* July, 1918.—See Bot. Absts. 1, Entry 1242.

1340. Rowlee, W. W. **Relation of marl ponds and peat bogs.** Mem. Brooklyn Bot. Gard. 1: 410–414. *Fig. 1–3.* July, 1918.

PATHOLOGY

Donald Reddick, *Editor*

[Unsigned abstracts are by the editor.]

1341. Arnaud, G. **[Sooty moulds of southern France.]** Bull. Soc. Path. Vég. France 4: 95. 1917. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 898. 1918.]

1342. BALL, E. D., AND R. E. VAUGHAN. **Pull the dangerous barberry bushes.** Wisconsin Agric. Exp. Sta. Ext. Circ. 102. *4 p.* 1918.—Popular discussion of the wheat stem-rust situation in Wisconsin and the relation of the common barberry to the spread of stem-rust. The common barberry is described and compared with the Japanese barberry.—*James G. Dickson.*

1343. BRIZI, U. **[Observations on the damage done to trees by tarring the streets of Milan, Italy.]** Rend. R. Inst. Sci. e Lett. Lombardo II, 50: 568–591. 1917.—"The injury is caused almost exclusively by the very fine dust raised by the passage of motor cars along the tarred roads." The harmful action of the dust is due largely to the action of the vapors given off by the tar when strongly heated by the sun. The most sensitive plants are *Aesculus hippocastanum* and *Ae. carnea.* [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 626–627. 1918.]

1344. CAMPBELL, C. **[The direct influence on the stock of the sap produced by the scion, and the action on the plant of acid solutions absorbed directly: experiments in Italy.]** Rend. R. Accad. Lincei V, 28: 57–61. 1918.—Comes' theory regarding correlation of resistance with acidity was tested.—A wild scion on a cultivated stock rendered shoots from peach and apple stocks resistant to *Exoascus deformans* and *Oidium farinosum* respectively.—Extraradicate introduction of weak solution of tartaric, citric and malic acids rendered cultivated apple immune to *Oidium farinosum* (*B. leucotricha*) and to certain insects. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 674–675. 1918.]

1345. CAPUS, J. **La défense contre les parasites de la vigne par les methodes culturales. [Protection against grape vine parasites by cultural methods.]** Rev. Vit. 48: 390–393. 1918.—Summer tying of shoots to prevent injury, to allow good circulation of air and to suppress foliage growth thus reducing amount of the mildews, and making treatments easier.—Coulure is reduced by this method but ringing is most effective.

1346. CAPUS, J. **Expériences sur l'action du polysulfure contre l'Oïdium. [Experiments on the action of polysulphid against Oidium of the vine.]** Rev. Vit. 48: 393–394. 1918.—Used "liver of sulfur" 500 grams per hectol with 500 grams soft soap. Two treatments with this equaled three treatments with dry sulfur. Notwithstanding author thinks dusting will continue preferable.—Trials with a mixture of lime-sulfur solution and bordeaux mixture for *Oidium* and *Plasmopara* gave promising results. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 1001–1002. 1918.]

1347. CHRISTENSON, C. I. **[The selection of some varieties of swede resistant to Plasmodiophora brassicae, in Denmark.]** Tidsskr. Plant. 26: 68–82. 1917.—Two varieties more resistant than "Pioneer" are recorded. Resistance is shown to be heritable. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 317–319. *Fig. 3.* 1918.]

1348. DOSDALL, LOUISE. **Overwintering of the aeciospores of Cronartium ribicola Fischer.** Phytopath. 8: 619. 1918.—Aeciospores obtained from deep aecial scars on a dead pine branch and believed to be spores which were produced one year previous gave from 1 to 2 per cent germination in sterilized distilled water.—*W. H. Rankin.*

1349. ELLIOTT, JOHN A. **Wood-rots of peach trees caused by Coriolus prolificans and C. versicolor.** Phytopath. 8: 615–617. *2 fig.* 1918.—Field observations on wood-rots following severe pruning within a small area in Arkansas. *Picnoporus cinnabarinus* and *Schizophyllum commune* although common are believed to be of secondary importance. Trees died within three years after pruning. Probable correlation between the severity of the injury and low heavy soil is suggested.—*W. H. Rankin.*

1350. FRACKER, S. B. **Crown gall on young apple trees.** Wisconsin Hortic. 8: 139. 1918.—Studies in Wisconsin nurseries indicate that the disease reduces the strength and size of the tree during nursery life from 15 to 20 per cent.—*James G. Dickson.*

1351. GLOVER, H. M. **An unidentified fungus injurious to the conifer Cedrus deodara in India.** Indian Forester 43: 498–499. Pl. 1. 1917.—Roots of plants about 1 foot high are attacked and the trees die. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 519. 1918.]

1352. HARA, K. [Japanese.] **[Dark-spot of summer orange (Citrus aurantium var. sinensis)].** Qua-Ju [Fruit culture] No. 188: 22–24. *Fig. 1–3.* 1918.—Studies on the dark-spot disease caused by *Cercospora* sp. on the living leaves of Summer orange (afterwards it was found to be Dai-Dai orange *C. aurantium* var. *amara*). Spots dark, round, 5 to 10 mm. in diameter more numerous near the edge of leaf. Advises spraying two to three times with bordeaux mixture in June.—*S. Hori.*

1353. HILEY, W. E. **Chrysomyxa abietis in England and Scotland.** Quart. Jour. Forestry 11: 191–192. 1917.—First record for England. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 398. 1918.]

1354. HORI, S. [Japanese.] **[The unusual out-break of the stripe disease caused by Helminthosporium gramineum Rabh. on barley in 1918.]** Nōgyō Sekai [The Agricultural World] 13^{14}: 20–28. 1918.—According to the report from the Department of Agriculture, the anticipated production of barley in 1918 was to be diminished about 24 per cent against the annual average, on account of the unfavorable climatic condition. In the late Spring and thenceforth the out-break of stripe-disease on barley was reported from the several prefectural experiment stations and from growers. The author has estimated, on a comparatively exact basis, the loss by the disease at about 800,000 Koku (about 4,092,000 American bushels) or one-third of supposed reduction. In 1896, the disease was severe in Provinces Awa and Mikawa, and author gave the explanation in Bull. Centr. Agric. Exp. Sta. 14: 134–140. 1899. It is generally accepted that late sowing is likely to bring on the disease; in the last autumn the temperature suddenly decreased at the proper sowing time and during the winter the climate was cold and dry, so that the result was the same with the late sowing, i.e., it retarded the germination and growth of barley.—The Jensen's hot water treatment may perfectly prevent the disease and it already has been proved experimentally.—*S. Hori.*

1355. HORI, S. [Japanese.] **[Lecture on mulberry diseases.]** Byo-chu-gai Zasshi [Jour. Plant Protec.] 4: 827–833, 915–920. 1917. *Ibid.* 5: 10–15, 93–95, 173–177, 251–255, 333–338, 423–427, 515–519. 1918.—Lecture on the principal diseases of Japanese mulberry, delivered to the sericulturist's class held at Uyeda, Nagano prefecture in November, 1916. It contains introduction, general relations to the environmental factors, parasitic diseases, non-parasitic diseases, and methods of control.—*S. Hori.*

1356. HUTCHINSON, C. M. **[Pseudomonas tritici n. sp., injurious to wheat in the Punjab.]** Mem. Dept. Agric. India, Bact. Ser. 1: 169–175. *Pl. 1–4.* 1917.—"Its principal characteristics are very similar to those described by Rathay and O'Gara for *Dactylis glomerata* and *Agropyron smithii* respectively." [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 630–631. 1918. Abst. in Exp. Sta. Rec. 39: 454. 1918.]

1357. ISHIKAWA, T. [Japanese.] **[New preventive method for bacterial wilt and stem rot of egg-plant.]** Byo-chu-gai Zasshi [Jour. Plant Protec.] 5^{6}: 20–25. 1918.—Conclusion of the three years experiments in the Niigata prefectural experiment station. It is proved that the application of lime-sulphur solution gives better results than use of wood ashes, lime, lime-nitrogen, formalin, etc. Two or three days before transplanting the seedlings, spray and thoroughly mix the soil with lime-sulphur solution (1°B.) at rate of 2 American gallons for 6 square feet of ground. Spray with 0.6°B. solution, in June to July, once or twice over the surface of the soil near the roots.—*S. Hori.*

1358. KEITT, G. W. **Control of cherry leaf spot in Wisconsin.** Wisconsin Agric. Exp. Sta. Bull. 286: 1–11. 1918.—Leaf spot is the most destructive fungus disease of the cherry in Wisconsin. Control measures recommended are: Early clean cultivation turning under

the dead leaves; and spraying with Bordeux, lime-sulphur or other standard spray (1) when the petals fall, (2) about two weeks later, (3) if necessary just after fruit is picked. [Abst. in Wisconsin Agriculturist 42: 19. Mar. 8, 1918. Also in Wisconsin Hortic. 8: 117. Apr., 1919.]—*James G. Dickson.*

1359. KINDSHOVEN, J. **Schädlinge des Gemüsebaues und ihre Bekämpfung.** [Enemies of vegetables and their control.] Flugschr. Deutsch. Landwirtschaftsges. 13. 6 Ed. *32 p.* Berlin, 1917.—Abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 37. 1918.

1360. LINDFORS, THORE. **[Verticillium albo-atrum a hyphomycete causing "vissnes juka" (wilt) of cucumber in Sweden.]** Land. Akad. Hand. och Tids. 57: 627–636. *2 fig.* 1917.—"*V. albo-atrum* is specific agent of wilt; its hyphae easily enter living tissue of both mature and young plants, and develop in large number in the vessels, which they stop up more or less completely."—*Ascochyta cucumis* produces a leaf-spot but no wilt.—*Fusarium sclerotioides* and *F. redolens* var. *angustius* do not cause wilt, but may give rise to a kind of stem-rot.—Disinfection of soil is not accomplished with 2 per cent potassium permanganate. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 634–635. 1918.]

1361. MCCLINTOCK, J. A. **[The resistance of peanuts to Sclerotium rolfsii.]** Science 47: 72–73. 1918. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 517–518. 1918.] [See Bot. Absts. 1, Entry 334.]

1362. MOREILLON, M. **[Diaporthe taleola, an ascomycete injurious to oaks, in Switzerland.]** Jour. For. Suisse 69: 1–3. *Pl. 1.* 1918.—Following light wind in September author found as many as ten branches per square meter, measuring as much as 1 cm. in diameter and nearly 50 cm. in length, caused to drop by action of this fungus. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 397–398. 1918.]

1363. NISHIDA, T. [Japanese.] **[Stippen or bitter-pit of apple.]** Byo-chu-gai Zasshi [Jour. Plant Protec.] 5: 520–526. 1918.—Author has given the Japanese name "Hi-yak" disease for stippen or bitter-pit of apple. It resembles in all respects a disease of Japan plum (Terada plum) which the author is investigating with special interest. For comparison, the stippen of apple is described.—*S. Hori.*

1364. NISHIDA, T. [Japanese.] **[Water supply of the soil in relation to fruit diseases.]** Byo-chu-gai Zasshi [Jour. Plant Protec.] 5: 801–806. 1918.—Stippen of Japan plum is entirely due to the high fluctuation of water supply of the soil at the growing season of fruit. This was proved by the experiment carried on at Terada, Pref. Ktoto. The disease was entirely prevented by the application of stable manure and by covering ground with rice straw. After observing the occurrence of stippen on apple in Corea and several apple districts of Hondo, author advises the regulation of water supply of orchard by applying stable or green manure, etc. and by other methods.—*S. Hori.*

1365. NOMURA, Y. [Japanese.] **Splits of the navel orange.** En-gei no Tomo [The Horticulturist's Friend] 14: 815–820. 1918.—Observations on the splits of the navel orange in the orange districts of Kochi Prefecture. It has close relation to the shape and size of fruit and to the climatic conditions especially during the growing season of fruit—September to October. Long fruit splits least, round much, and flat more. Relation to rainfall is proved by meteorological observations. In the rational orchard the damages are least.—*S. Hori.*

1366. PATOUILLARD. **[Observations on the parasitism of the ascomycete, Ustulina vulgaris, in France.]** Bull. Soc. Path. Vég. France 4: 100. 1917.—Fungus killed two lime trees in Ain. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 772. 1918.]

1367. PEGLION, VITTORIO. **[Observations on hemp mildew (Peronoplasmopara cannabina) in Italy.]** Rend R. Accad. Lincei (Cl. Sci. Fis., Mat. e Nat.) 26: 618–620. 1917.—Disease of little consequence except in rare instances. Life history, morphology and taxonomy of fungus. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 118–119. 1918.]

1368. Pestico, J. F. ["Fucha" of the cotton plant in the department of Boyacá, Republic of Colombia.] Riv. Agric. 4: 113–116. *1 fig.* 1918.—"The disease is characterized by numerous small swellings on the leaves and young branches and, more rarely, on the flowers. It usually becomes visible after prolonged rains and diseased plants fade and die one or two weeks later." Lack of good cultural practice is said to cause the appearance of the disease. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 998. 1918.]

1369. Pethybridge, George H., and H. A. Lafferty. **A disease of flax seedlings caused by a species of Colletotrichum, and transmitted by infected seed.** Sci. Proc. Roy. Dublin Soc. 15: 359–384. *Pls. 19–20.* 1918.—Disease has been reported as "yellowing" but the author regards damping-off a more appropriate name. The causal organism is *C. linicolum* n. sp. It hibernates as mycelium in the cells of the epidermis of the seed-coat. Seedlings are infected during or subsequent to seed-germination. Control is accomplished by the application of a mixture of finely powdered copper sulfate crystals and dry sodium carbonate to slightly moistened infected seed. The disease is believed to be widespread over the globe, flax-seed from Russia, Holland, Canada, United States of North America and Japan giving rise to diseased seedlings.—*L. R. Hesler.*

1370. Rorer, J. B. **[The South American Hevea leaf disease in Trinidad.]** Bull. Dept. Agric., Trinidad a. Tobago 16: 128–129. 1917. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 253–254. 1918.]

1371. Salomon, René. **[Vines offering a relative resistance to mildew.]** Rev. Vit. 47: 314–316. 1917.—[Through abst. (naming the varieties and their relative resistance) in Internat. Rev. Sci. Pract. Agric. 9: 117–118. 1918.]

1372. Schander. **Welche Ursachen bedingten die geringe Kartoffelernte im Jahre 1916 und was können wir daraus lernen? [What causes contributed to the reduced yield of the potato in the year 1916 and what we can learn from them?]** Landw. Centralbl. Prov. Posen Heft. 12. 1917.—[Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 41. 1918.]

1373. Schander. **Einfluss der Bodenbearbeitung, Düngung u. s. f. auf den Ertrag und den Gesundheitszustand der Kartoffeln. [Influence of soil-treatment, fertilization, etc. on the yield and health of the potato.]** Landwirtschaftl. Centralbl. Prov. Posen. H. 14. *5 p.* 1917. —Abst. by Matouschek in Zeitschr. Pflanzenkr. 28: 40–41. 1918.

1374. Schöyen, T. H. **Om skadeinsekter og snyltesopp paa skogträerne i 1915. [On the injurious insects and fungi of forest trees in 1915.]** Skogdirectörens indberetning for kalenderaaret 1915: 154–159. *Pl. 1.* Kristiania, 1917.—*Phytophthora omnivora, Brunchorstia destruens* (*Crumenula abietina*) and *Fusoma pini* mentioned. [Through abst. by O. von Kirchner in Zeitschr Pflanzenkr. 28: 33–34. 1918.]—*W. H. Rankin.*

1375. Schöyen, T. H. **Statsentomolog T. H. Schöyens beretning. 1916. [Fungi, insects and animals injurious to cultivated plants in Norway in 1916.]** Aarsberetning angaande de offentlige foranstaltninger til landbrucketsfremme i Aaret 1916: 39–94. *24 fig.* 1917.—Abstract of the Norwegian law of 1916 for the suppression of diseases and pests. A penalty is imposed on those who fail to report diseases, etc. *Berberis vulgaris* is to be destroyed. *Puccinia graminis, Synchytrium endobioticum* and *Sphaerotheca mors-uvae* are considered injurious to agriculture.—Record of diseases of various crops.—Experiment for control of *Sphaerotheca mors-uvae* showed formaldehyde, 1.6 per cent solution, most effective. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 31–33. 1918. Also through abst. in Internat. Rev. Sci. Pract. Agric. 9: 514–517. 1918.]

1376. Setchell, William A. **Parasitism among the red algae.** Proc. Amer. Phil. Soc. 57: 155–172. 1918. [See Bot. Absts. 1, Entry 767.]—"Parasites among the members of the Rhodophyceae, or Red Algae, are becoming more and more known. The author has been paying special attention to these parasites for some years. Of some 51 species, old or new,

known to be wholly or partially parasitic, 39 are on plants of the same family of Red Algae, 8 others are on Red Algae not of the same family but with some on hosts fairly nearly related, while only 4 are parasitic on hosts belonging to other groups (brown or green algae). These facts seem significant as to the origin of these parasites. The epiphytic red algae often penetrate the host plant which is commonly also one of the Red Algae, but also may be either brown or green. Some light may be thrown on the origin of red parasites, particularly of those parasitic on close relatives by the behavior of the tetrasporangia of *Agardhiella tenera.* As described by Osterhout in 1896 the zonate tetrasporangia germinate as a whole even after division into tetraspores, and produce dwarf unbranched plantlets which penetrate the tissues of the parent plant by basally produced rhizoids. The plantlets produced are largely antheridial, but some are cystocarpic and some even tetrasporic. Such mutations as these plantlets of *Agardhiella* seem to represent, accompanied by a greater or less degree of chlorosis, go far toward indicating a possible origin of these parasites on closely related hosts." [Through author's abst. in Science 47: 620. 1918.]

1377. SHREVE, FORREST. **Cultures of mistletoe.** [Rev. of: Weir, James R. Experimental investigations on the genus Razoumopkya. Bot. Gaz. 66: 1–31. 1918.] Plant World 21: 159. 1918. [See Bot. Absts. 1, Entry 1648.]

1378. STEBLER, F. G., A. VOLKART, AND A. GRISCH. **Samenuntersuchungen vom 1. Juli 1915 bis 30. Juni 1916 und Versuchstätigkeit für das Jahr 1916. [Seed investigations from July 1, 1915, to June 30, 1916, and research activities for the year 1916.]** Jahresber. Schweiz. Samenuntersuchungs- und Versuchsanstalt in Oerlikon-Zürich 39: 1–34. 1917.—A disease of rye caused by a species of *Fusarium* was very common and destructive. The stem-scorch of red clovers caused by *Gloeosporium caulivorum* was observed once. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 30. 1918.]—*W. H. Rankin.*

1379. TAUBENHAUS, J. J. **On a sudden outbreak of cotton rust (Aecidium gossypii) in Texas.** Science 46: 267–269. 1917.—Abst. in Internat. Rev. Sci. Pract. Agric. 9: 518–519. 1918.

1380. TUNSTALL, A. C. **The spraying of tea in north-east India.** Agric. Jour. India (Special Indian Science Congress Number). *P. 73–80.* 1918.—An account of the improvements in machinery and in organization necessary to make spraying practicable in tea gardens. Plants are sprayed in dormant condition with caustic soda to remove epiphytes. Strengths above 2 per cent are harmful. Preventive treatments during growing season interfere with tea culture because of habit of growth and nature of product.—Plans have been made for disease patrols similar to fire patrols who will on occasion stamp out incipient epiphytotics.—Types of knap-sack sprayers, nozzles, spray mixtures, etc., have been tested.

1381. UZEL, H. **Zum Verziehen der Zuckerrübe. [On the distortion of sugar-beets.]** Blätter für Zuckerrübenbau 24: 138–139. 1917.—Abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 41. 1918.

1382. VAUGHAN, R. E. **Potato seed treatment—Lessons from 1917.** Wisconsin Potato Growers' Assoc. Bull. 3: 60. 1918.—Corrosive sublimate—1:1000—recommended in potato seed treatment as it is more effective than formaldehyde against Rhizoctonia and equally as good for scab (Oospora) and black leg (bacterial).—*James G. Dickson.*

1383. VOGLINO, P. **[Bacteria and fungi recorded as parasitic on cultivated plants in the province of Turin and adjacent regions in 1916].** Ann. R. Acad. Agric. Torino 40: 205–229. 1918.—A review listing 110 diseases caused by bacteria and fungi.—A service of "preventive detection" for vine mildew is described. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 909. 1918.]

1384. YORK, H. H., AND PERLEY SPAULDING. **The overwintering of Cronartium ribicola on Ribes.** Phytopath. 8: 617–619. 1918.—Urediniospores from dead leaves remaining on

the bushes over winter were used to inoculate *R. nigrum* in greenhouse in April. One uredinium developed. A similar experiment in another greenhouse yielded seven sori. Also urediniospores from specimens placed in herbarium for one year produced two sori on inoculated plants. A single spore from unbroken urediniosorus on the herbarium material was observed to germinate under the microscope. These results are believed to indicate that *C. ribicola* may occasionally overwinter on dead *Ribes* leaves.—*W. H. Rankin.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

1385. ANONYMOUS. **Note on a new oil-containing fruit.** Mexican Notes, March 2, 1918. —A new fruit "chichopoxtle," containing a large amount of fatty oil has been found growing in the region of Torreon. Since the oil proved to be a lubricant of high quality and occurs in quantities amounting to 25 per cent, the cultivation of this oil fruit on a large scale is planned. No scientific name is given. [Through abst. in Chem. News 117: 228. 1918.]—*Arno Viehoever.*

1386. GRIEBEL, C. **Contributions to the microscopy of coffee substitutes (especially spurry and locust seeds.)** Zeitschr. Nahrungs- u. Genussmit. 35: 272–277. 1918.—Among the numerous coffee substitutes chicory and beets play the main rôle. In addition however waste products have been used like potato pulp, husks of grapes or other fruits, tree bark, the stony part of fruitshells and kernels or stonefruits of plants such as hawthorn, rose, etc. Spurry as well as locust seeds have been used as coffee substitutes and Griebel discusses them in detail.

1. Spurry (*Spergula arvensis*, Caryophyllaceae), growing quite generally as a weed on sandy soil, is under cultivation for feed in Western Germany. The black seeds are a little larger than 1 mm., spherical in diameter, somewhat compressed and surrounded by a small light wing. The seed surface is minutely warty and more or less covered with thick, club shaped, hair like structures of gray brown color. The appearance of the testa epidermis, as is the case with that of other caryophyllaceae, is characteristic for microscopic identification representing black brown cells with thick walls, the outlines showing wavelike curves. Some of these cells are grown out to the thick walled, hair like structures referred to. These structures are covered with warts which are formed somewhat like a sucking bowl. The remaining tissue is not especially characteristic except possibly that of the wing in so far as the epidermis cells here also have small wartlike thickenings. Illustrations are given of the structures referred to.

2. Locust seed (*Robinia Pseudo-Acacia*, Leguminosae). Repeated feeding of locust seeds to mice showed, contrary to previous belief, their nonpoisonous character. The anatomy of the 6 mm. long, brown seeds is not different from the structure generally characteristic for Leguminosae. The seed-coat consists of slender palisade cells, 90 to 100μ high, of column cells, about 30μ high and of endosperm, formed by a layer of cells containing aleurone masses and another inner layer of cells with somewhat mucilaginous walls. The tissue of the cotyledons contains besides protein, some fat but no starch. The regular, long and slender cells are especially characteristic for the roasted and ground product. Drawings are given, illustrating the observations recorded.

3. Seeds of *Gleditsia triacanthos* (American bean tree). Griebel makes the suggestion that possibly also these seeds could be used as coffee substitute, since they were fed to mice and eaten by other animals without injury. The seeds are flat, egg shaped and may be as large as 1 cm. (The presence of alkaloids in the seeds of this species has been reported and again been disputed.)—*Arno Viehoever.*

1387. KOFLER, LUDWIG. **Typha as a starch plant.** Zeitschrs. Unters. Nahrungs- u. Genusmit. 35: 266. 1918.—Of the 5 species of Typha indigenous to Middle Europe, Typha latifolia, T. angustifolia, T. minima, T. Shuttleworthii, T. gracilis, only T. latifolia has prac-

tical value. The plant or certain parts have already in previous times been used for technical as well as medicinal purposes. Of special interest is the use of the rhizome as food in Asia, New Zealand and North America. The rhizomes especially in fall or winter are filled with starch. Loges found in the dried material 46 per cent of starch, while Thoms isolated only 30 per cent from rhizomes that had been collected in spring and showed some young growth.—Detailed description of the rhizomes, roots and runners is given and the characteristics of the powder are pointed out. Two distinct kinds of starch grains were observed: large grains, monarch to triarch, a single grain measuring about 13μ in diameter, the point of origin, if visible, centrally located, lamellae not visible; small grains, monarch to polyarch, usually monarch, 3.5μ average diameter. The tracheae have ladder-like thickenings, the sclerenchyma bundles consist of fibers with walls only very little thickened and with pits oblong and arranged at 45° to the longitudinal axis. The star shaped parenchyma, forming part of the bark, contains only the small starch grains. Of especial diagnostical value are also cells called "Inklusen." These are rather uniformly, though not abundantly, distributed throughout the tissue and contain, bedded in a gummous groundmass, phloroglucinol and catechin derivatives of a tanninlike nature. Sections or powder treated with p-dimethyl-amidobenzaldehyd and sulphuric acid colors these cells wine red, while the other tissue remains colorless. Illustrations are included showing some of the characteristics mentioned.—The striking characteristics of other plant products, such as *Pteridium aquilinum*, *Cyperus*, *Asphodeles*, *Scirpus* and *Juncus* are also very briefly mentioned. [See next following Entry, 1388.]—*Arno Viehoever.*

1388. Kofler, Ludwig. **Note on the eagle fern, Pteridium aquilinum.** Since with the usual methods of analysis no poisonous substance had been found by some other investigators, this fern was collected in large amounts for use in food or feed. Bread was prepared containing a considerable amount. The consumption of this bread, especially in Bosnia, caused serious injuries and in a number of cases even death. The rootstocks of *Pteridium aquilinum* contain starch grains with oblong and irregular shape, tracheae with bordered pores and a brown, strongly suberized rind. (Of interest is that Greshoff found a cyanogenetic amygdalin-like glucoside in *Pteris aquilina* L, a plant which is now considered synonymous with *Pteridinum aquilinum* Kuhn. Only mature plants were found to yield no hydrocyanic acid.) [See next preceding Entry, 1387.)—*Arno Viehover.*

1389. Weehuizen, M. F. **On the phenol of the leaves of Coleus amboinicus Lour. (C. carnosus Hassk.)** Recueil. Trav. Chim. Pays Bas et Belgique 37: 355–356. 1918.—The leaves of *Coleus amboinicus* Lour (Labiatae), a much desired medicinal plant, indigenous to Java, have a distinct aromatic odor which is due to an ethereal oil present in small amounts. While Boorsma previously had obtained 0.055 per cent, Weehuizen after distilling 120 kilos of the fresh herb found only about 25 cc. or about 0.021 per cent of ethereal oil. The low yield is attributed to the presence of stems, which do not contain any volatile oil. From the ethereal oil a phenolic substance was isolated which could be identified as carvacrol. The melting point of the carvacrolphenylurethane was found to be 134°–135°, thus agreeing with data given by Goldschmidt and not with other data in literature, stating the compound to melt at 140°.—*Arno Viehoever.*

PHYSIOLOGY

B. M. Duggar, *Editor*

[Unsigned abstracts are by the editor.]

GENERAL

1390. Anonymous. **Suitable storage conditions for certain perishable food products.** U. S. Dept. Agric. Bull. 729. *p. 10.* 1918.

1391. Rogers, L. A. **The occurrence of different types of the colon-aerogenes group in water.** Jour. Bact. 3: 313–328. 1918.—An attempt to determine (1) the fate of the two chief

forms of the fecal bacillus in water in respect to multiplication and attenuation, and (2) if a colon isolation necessarily indicates fecal contamination. The *Bacillus-aerogenes* type is found to survive unfavorable conditions longer than *B. coli*, and some data are furnished regarding the effect on physiological cultural characters of the exposure to such conditions. Evidence in regard to the second point is not yet final. It is believed that material assistance in methods is assured by the ability to separate the colon-aerogenes group into varieties.

1392. Smith, Annie L. **The relation of fungi to other organisms.** Trans. Brit. Mycol. Soc. 6: 17–31. 1918.—A presidential address with discussion of the literature on phases of parasitism, methods of parasitic attack, reaction of the host cell, and symbiosis.—*S. M. Zeller.*

1393. Truog, E. **Soil acidity: 1. Its relation to the growth of plants.** Soil Science 5: 169–195. 1918.—This is a general article which draws to the attention of physiologists and agronomists the complexity of the problems relating to soil acidity, a condition which is considered to have many indirect and general influences on the growth of plants due to a relation of physical, chemical, and biological soil factors. In the discussion of soil acidity the following points receive consideration, namely: general fertility, prevalence of plant diseases, competitive powers of plant species, the relation of available calcium to the symbiotic nitrogen-fixing bacteria and to the root tissue of the plants.

WATER RELATIONS

1394. Harrington, George T., and William Crocker. **Resistance of seeds to desiccation.** Jour. Agric. Res. 14: 525–532. 1918.—Using seeds of Gramineae the authors were able to corroborate the results of Pickholz and Waggoner and (in part) to controvert those of Ewart. It was shown that the germination capacity of a number of grasses was not changed when the seed had been dried in vacuo over calcium oxide to 1 per cent or less of moisture. Careful determinations were made of germination energy as well as germination capacity, the former being more readily affected than the latter.

1395. Livingston, B. E. **Porous clay cones for the auto-irrigation of potted plants.** Plant World 21: 202–208. 1918.—A modification of the cylindrical porous cup method devised especially to overcome the difficulty of imperfect soil contact. An important feature of the new device is that it is conical; the widest portion may impinge against the narrower basal portion of the side wall of the pot, and the neck with cork, etc., projects above the soil. Such an arrangement with an oblique porous surface insures contact with the shifting or slipping soil, and at the same time furnishes a large water-supplying surface. The remainder of the mechanism follows the plan of the older device except that an arrangement is included for liberating contained air and for emptying the system.

MINERAL SALT RELATIONS

1396. Headden, W. P. **Alkalies in Colorado (including nitrates).** Colorado Agric. Exp. Sta. Bull. 239. *68 p.* 1918.—A popular account of the problems of alkali in agriculture, using term "alkali" to designate all soluble salts (including nitrates) found in the soil. Discusses the source of the various salts and their transport by streams. Includes summary of author's views upon harmful action of excess of nitrate, in which it is stated that harmful amounts of nitrates are formed by the agency of *Azotobacter*. "White alkali," consisting of sulphates and chlorides of sodium, calcium, and magnesium, is not regarded as harmful to cultivated plants. "Black alkali," consisting of sodium carbonate, is held to be dangerous only where drainage conditions are poor.—*H. S. Reed.*

1397. Reed, Howard S. **Absorption of sodium and calcium by wheat seedlings.** Bot. Gaz. 66: 374–380. *Fig. 1.* 1918.—For the tests reported wheat seedlings were grown on disks of perforated aluminum floated by glass bulbs on solutions of the same composition as those

in the experiments. Special precautions were taken to prevent contamination through dust and chemical injuries. The experiments were designed primarily to determine the value of some of Osterhout's proportions in weak solutions supplemented by analyses which should indicate the amount of the solutes absorbed. The results indicate that the antagonism of calcium and sodium exists in extremely dilute solutions (230 to 4000 parts per million) and the most successful antagonism in the solutions employed was 98:2. This ratio seemed not to exclude the sodium from entrance but rendered it harmless, and is considered an internal effect rather than a peripheral effect.

1398. Winslow, C. E. A., and I. S. Falk, **Studies on salt action. I. Effect of calcium and sodium salts upon the viability of the colon bacillus in water.** Proc. Soc. for Exp. Biol. and Med. 15: 67–69. 1918.—A study of the antagonistic influence of calcium and sodium chloride in order to secure a viability curve, the latter being found to be much the same for this bacillus as for higher forms of life. [See Bot. Absts. 1, Entry 177.]

METABOLISM (GENERAL)

1399. Hasselbring, Heinrich. **Effect of different oxygen pressures on the carbohydrate metabolism of the sweet potato.** Jour. Agric. Res. 14: 273–284. 1918.—Since from earlier studies evidence had been adduced to the effect that reducing sugar in the sweet potato is an intermediate product in the transformation from starch to cane sugar under storage conditions this investigation was undertaken in the hope of further separating the various steps in this process. The method of study consisted in halving lengthwise the freshly dug sweet potatoes, utilizing one set of halves for immediate analysis and storing the other under experimental conditions, the latter being subjected to gas pressures, varying from several atmospheres to less than one atmosphere. Among the results are to be noted (a) the killing action on the tissues of gas pressures of five atmospheres or more, (b) the demonstration that starch and cane sugar hydrolysis are independent of free oxygen supply, and (c) the greater consumption of material by the sweet potato and a greater CO_2 output in anaerobic respiration than in normal respiration—the time and temperature factors being comparable.

1400. Hughes, J. S. **Some nutritive properties of corn.** Kansas Agric. Exp. Sta. Tech. Bull. 5. *39 p., 9 fig.* 1918.—A physiological study of the effects upon animals of the constituents of maize grain. Corn grain alone is an adequate diet for adult pigeons for maintenance, at least during a period of one year. Corn bran contains relatively large amounts of antineuritic substances similar to those called vitamines by Funk, and water-soluble B by McCollum. However, a diet of corn+ synthetic salt mixture was not adequate for normal growth of chickens. Corn + synthetic salt mixture + casein formed a suitable ration, but if the casein were extracted with alcohol and ether or autoclaved, it lost its value. The loss of efficiency is probably due to destruction of accessories.—*H. S. Reed.*

1401. Johnsen, B., and R. W. Hovey. **The determination of cellulose in wood.** Jour. Soc. Chem. Indust. (Trans.) 37: 132–137. 1918.—A modification of Cross and Bevan's chlorination method is described, which chiefly differs from theirs in that the cellulose is hydrolyzed by a mixture of acetic acid and glycerin (in equi-molecular proportions) at 135°C. before chlorination. The results of analyses of different woods are given and variations in cellulose content in different parts of the same tree are recorded. A number of analyses are also given in regard to other substances in wood—namely, lignin, the substances yielding furfural, and other carbohydrates of comparatively low molecular weight. [Through abst. by W. S. in Physiol. Absts. 3: 282. 1918.]—*S. M. Zeller.*

1402. Kraus, E. J., and H. R. Kraybill. **Vegetation and reproduction with special reference to the tomato.** Oregon Agric. Exp. Sta. Bull. 149. *90 p., 22 fig.* 1918.—One of a series of investigations on the problem of pollination of the pomaceous fruits considered from the physiological and bio-chemical standpoint. Four general conditions of the relation of nitrates, carbohydrates, and moisture within the plant itself, and the responses apparently

correlated therewith are discussed. These are: (1) Though there be present an abundance of moisture and mineral nutrients, including nitrates, yet without an available carbohydrate supply vegetation is weakened and the plants are non-fruitful; (2) An abundance of moisture and mineral nutrients, especially nitrates, coupled with an available carbohydrate supply, makes for increased vegetation, barrenness, and sterility; (3) A relative decrease of nitrates in proportion to the carbohydrates makes for an accumulation of the latter, and also, for fruitfulness, fertility, and lessened vegetation; (4) A further reduction of nitrates without inhibiting a possible increase of carbohydrates, makes for a suppression both of vegetation and fruitfulness. Results of recent investigations on cultivation and companion cropping, nitrogenous fertilizer applications, and pruning are examined in the light of these four general conditions. The literature dealing with a suggested relationship between plant responses and the availability of elaborated and non-elaborated food is reviewed. The experimental data deals with a comparative study of the internal conditions in tomato plants which were setting fruit and those which were not, particularly with reference to the presence of total nitrogen, nitrates, moisture and carbohydrates and the relations between them. Extensive chemical and micro-chemical determinations of moisture, dry matter, total nitrogen, free reducing substances, sucrose and starch were made on stems and leaves of tomato plants growing for varying periods under varying nutrient conditions. Plants grown with an abundant supply of available nitrogen and the opportunity for carbohydrate synthesis, are vigorously vegetative and unfruitful. Plants grown with an abundant supply of nitrogen and then transferred and grown with a moderate supply of available nitrogen are less vegetative but fruitful. Plants grown with an abundant supply of nitrogen and then transferred and grown with a very low supply of available nitrogen are very weakly vegetative and unfruitful. When plants which have been grown with a large supply of available nitrogen and moisture are subjected to a reduced moisture supply just about the wilting point there is a decrease in vegetative activity. Whatever the conditions under which a plant has been grown, considering the whole plant as a unit, increased total nitrogen and more particularly increased nitrate nitrogen are associated with increased moisture and decreased free-reducing substances, sucrose, polysaccharides, and total dry matter. Fruitfulness is associated neither with highest nitrates nor highest carbohydrates, but with a condition of balance between them. There is a correlation between moisture content and nitrate nitrogen. In general, within the plant itself, in the stem from the top to bottom, there is a descending gradient of total nitrogen and moisture, and an ascending gradient in total dry matter, polysaccharides and sucrose. The proportion of free-reducing substances to other carbohydrates, total nitrogen, and nitrate nitrogen is variable. The available carbohydrates constitute as much of a limiting factor in growth as the available nitrogen and moisture supply. The conditions for the initiation of floral primordia and even blooming are probably different from those accompanying fruit setting. Fruit production is seemingly a specialized vegetative function usually more or less closely associated with the function of gametic reproduction. Until more exact information is available, both environmental and hereditary factors must be considered in any attempted explanation of the reproductive or vegetative behavior of plants.—*E. W. Bailey.*

1403. Nakeseko, Rokuro. **Approximate determination of protein in physiological fluids.** Mem. Coll. Sci. Kyoto Imp. Univ. 3: 93–112. 1918. [Through abst. by Joseph S. Hepburn in Chem. Absts. 3: 1887–1888. 1918.]

1404. O'Neill, P., and A. G. Perkins. **The coloring matters of camwood, barwood, and sanderswood.** Jour. Chem. Soc. (Trans.) 113: 125–140. 1918.—These dye woods and caliaturwood give very similar red dyes. Camwood gives to mordanted wood somewhat bluer tones than the other three. The more insoluble coloring matter is isosantalin, $C_{32}H_{18}O_6OMe_2$), and is isomeric with the santalin of sanderswood. The coloring properties of barwood are identical with the latter. [Through abst. by W. S. in Physiol. Absts. 3: 282. 1918.] —*S. M. Zeller.*

MISCELLANEOUS

1405. Bigelow, W. D. **Scientific research in the canning industry.** Jour. Franklin Inst. 186: 1–14. 1918.

1406. Clark, A. W. and L. Du Bois. **"Jelly value" of gelatin and glue.** Jour. Indust. and Engin. Chem. 10: 707–709. 1918.

1407. Gortner, R. A. and E. H. Doherty. **Hydration capacity of gluten from "strong" and "weak" flours.** Jour. Agric. Res. 13: 389–419. 1918.

1408. Koessler, J. K. **Studies on pollen and pollen disease. I. The chemical composition of ragweed pollen.** Jour. Biol. Chem. 35: 415–424. 1918.—Walls of pollen grains do not disintegrate after boiling 15 minutes in 15 per cent. HCl or after digestion with trypsin at 37°C. for 24 hours. An extract was made which was active on hayfever patients. It was expressed from 11 gms. of pollen which had been in 300 cc. of 8.5 per cent. NaCl at 37°C. for 10 hours, and gave the ordinary protein tests. The amount of nitrogen present in the pollen is 4.72 per cent. The highest possible protein content would be 11.37 per cent. The water content is 10.5 per cent and the ash 10.6 per cent. Reducing sugars, 6.89 per cent. Ether soluble lipoids, 10.3 per cent. Insoluble in ether but soluble in 95 per cent alcohol, 12.5 per cent. Extractives soluble in alcohol and water, 11.5 per cent. Insoluble residue, 37.71 per cent. [See Bot. Absts. 1, Entry 719.]—*C. H. Farr.*

1409. Sharples, A. **The lactiferous system of Hevea brasiliensis and its protective function.** Ann. Bot. 32: 247–257. 1918.—In spite of the long accepted belief that the gum is inhibitive against insect and fungous attacks, experiments show that the corky layer of bark is the important protective agent and not the lactiferous layer; for, if the green cork cambium is left undisturbed the susceptibility to attack is less than when removed. In tapping the limiting factor is the rapid removal of the bark, which disturbs the inner cortical tissues and does not give sufficient time for renewal, but not the quantity of sap taken. The open problem is whether the latex is a waste product, the removal of which does not affect the living processes of the tree, or whether it is an essential product, the removal of which stimulates increased replacement activity.—*S. M. Zeller.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor.*

BRYOPHYTES

1410. Andrews, A. LeRoy. **A collection of mosses from North Carolina.** Bryologist 21: 61–67. 1918. This is a list of species determined from collections made mostly by Prof. G. F. Atkinson in 1901 at various points in the Blue Ridge and Black Mountains. The data include only the localities and collection numbers.—*E. B. Chamberlain.*

1411. Britton, Elizabeth G. **Mosses from Florida collected by Severin Rapp.** Bryologist 21: 27–28. 1918.—This is a brief notice of the recent discovery in Florida of the occurrence of certain species of tropical mosses. New combinations occur in *Sematophyllum* and *Raphidostegium*.—*E. B. Chamberlain.*

1412. Britton, E. G. **"The Catkin-Hypnum with long hoses."** Bryologist 21: 32. 1918.—The paper notes a distinguishing character of *Leucodon julaceus*, and the range of Austin's "*forma stolonifera*" of the same species.—*E. B. Chamberlain.*

1413. Britton, E. G. **Jaegerinopsis squarrosa, n. sp.** Bryologist 21: 48–50. *Pl. 14.* 1918.—A sterile species of moss from Cuba and Florida is described and figured as new.——*E. B. Chamberlain.*

1414. Britton, E. G. **Further notes on Jaegerinopsis, Broth.** Bryologist 21: 80. 1918. —Additional differentiating characters for *Jaegerinopsis squarrosa* are given and brief comparisons made with other species of the genus.—*E. B. Chamberlain.*

1415. Britton, Elizabeth G. **Porotrichum, not Thamnobryum.** Bryologist 21: 83–84. 1918.—The author maintains that the publication of new combinations under the new generic name *Thamnobryum* was needless, as all species may be included in *Porotrichum.*—*E. B. Chamberlain.*

1416. Emig, W. H. **Octodiceras julianum Brid., var. ohioense, new variety.** Bryologist 21: 60–61. *Pl. 26.* 1918.—A new form of aquatic moss is described from Ohio, figures being given of both species and variety.—*E. B. Chamberlain.*

1417. Frye, T. C. **The Rhacomitriums of Western North America (concluded).** Bryologist 21: 1–16. *Pl. 1–14.* 1918.—This article is a continuation from November, 1917, issue of same journal. Thirteen species and varieties, of the genus *Rhacomitrium,* occurring north of the Mexican boundary in the western part of North America are described and figured. Ranges, comparative notes, and the principal synonyms are given as well as a tabular key to the various species; in the earlier portion of the article (November issue) a key of the usual form is also given. One new combination is made.—*E. B. Chamberlain.*

1418. Jennings, O. E. **Notes on the mosses of northwestern Ontario. I. Sphagnum.** Bryologist 21: 69–77. *Pl. 27, map.* 1918.—This is an annotated list of twelve species of *Sphagnum* collected along the northern shore of Lake Superior and around Lake Nipegon. Detailed lists of the collections are given, and brief summaries of the general continental range of the various species, as well as specific citation of previous Canadian reports. An outline of the general character of the country is also given.—*E. B. Chamberlain.*

1419. Levy, Daisy J. **A station for Ephemerum near New York City.** Bryologist 21: 33. 1918.

1420. Nichols, George E. **Additions to the list of Bryophytes from Cape Breton.** Bryologist 21: 28–29. 1918.—Four hepatics and twelve mosses are listed as additions to the author's previous list of species.—*E. B. Chamberlain.*

1421. Nieuwland, J. A. **Critical notes on new and old genera of plants. X.** Amer. Midland Nat. 5: 50–52. 1917.—The author changes the generic name *Thamnium* Bry. Eur. to *Thamnobryum* on account of an older *Thamnium* Klotsch, making eight new combinations. He also publishes *Villania,* with three new combinations, in place of the algal genus name *Zonaria* J. Ag., and *Kulmites,* with one new combination in place of the fossil-plant name *Taenidium* Heer.—*E. B. Chamberlain.*

1422. Sherrin, W. R. **The Lamellae of Polytrichum.** Jour. of Bot. 56: 105–107. 1918. —The lamellae on the inner surface of the leaves of *Polytrichum* which furnish valuable diagnostic characters can be scraped off and examined laterally under the microscope without the necessity of section-cutting. Figures and keys illustrate the use of the characters thus obtained for the species found in Great Britain.—*A. Le Roy Andrews.*

1423. Thériot, I. **Note sur une mousse du Chili.** Recueil Publ. Soc. Havraise d'études diverses. 1er trimestre, 1917: 1–7. [Repaged reprint, no date of publication.]—*Barbula flagellaris* Schimp. has been misinterpreted by authors. The plants currently called *P. flagellaris* belong to *P. depressa* Sull. while the true form is a *Tortula* (*T. flagellaris* (Schimp.) Ther.) that has also been described as *T. perflaccida* Broth.—*E. B. Chamberlain.*

1424. Thériot, I. **Mousses du Caucase.** Bull. Geog. Bot. July–Sept., 1918: 121–137. 1918.—An annotated list of species from two collections made principally in Daghestan and in Adzaria, with new forms in *Dicranella* (2), *Fissidens, Mniobryum, Bartramia*; and new species in *Homalia* and *Brachythecium* (2).—*E. B. Chamberlain.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

[Unsigned abstracts are by the editor.]

1425. ANONYMOUS. **Novitates Africanae.** Ann. Bolus Herb. 2: 153–162. *Pls. 10–13.* 1918.—Under the above title the following new species are described from South Africa: *Empleurum fragrans* Glover, *E. latiflora, E. Ethelae, E. dulcis, E. gallorum, E. excavata, E. Westii, E. Symonsii* L. Bolus, *Erica Cameronii, E. elimensis, E. Varderi, E. Dykei, E. Pearsoniana, E. arenaria* L. Bolus, *Geissorhiza tulbaghensis, Tritonia lilacina, T. Flanaganii* Bolus f., and *Watsonia albertiniensis* Glover.

1426. FERNALD, M. L. **An intergeneric hybrid in the Cyperaceae.** Rhodora 20: 189–191. *Pl. 125.* 1918.—Fernald describes and illustrates a new hybrid, × *Cyperus Weatherbianus* (*Cyperus dentatus* × *Rynchospora capitellata*), from Massachusetts.

1427. FORBES, CHARLES N. **The genus Lagenophora in the Hawaiian Islands.** Occasional Papers Bernice Pauhi Bishop Mus. Polynes. Ethn. and Nat. Hist. 6: 55–62 [301–308]. *Pl. 1–4.* 1918.—Three species and one variety are recognized of which *Lagenophora mauiensis* Mann forma *emarginata, L. Erici* Forbes, and *L. Helena* Forbes & Lydgate are described as new to science.

1428. FREEMAN, GEORGE F. **The purple hyacinth bean.** Bot. Gaz. 66: 512–523. *Fig. 1–7.* 1918.—The author presents a discussion of the plants cultivated under the name of hyacinth bean and concludes that there are two distinct species namely, *Dolichos Lablab* L. and *D. lignosus* L.

1429. JUEL, H. O. **Beiträge zur Blütenanatomie und zur Systematik der Rosaceen.** K. Sv. Vet. Akad. Handl. 58⁵: *p. 1–81. Text fig. 136.* 1918.—The author proposes a rearrangement in the sequence of the genera of the Rosaceae, based primarily on considerations of the ovule.

1430. MACBRIDE, J. FRANCIS. **I. Further new or otherwise interesting Liliaceae. II. A revision of Mirabilis, subgenus Hesperonia. III. A revision of Mentzelia, section Trachyphytum. IV. Certain North American Umbelliferae. V. Reclassified or new Compositae, chiefly North American Helenieae. VI. Various American Spermatophytes, new or transferred.** Contrib. Gray Herb. Harvard Univ. N. S. 56: 1–61. 1918.—The titles clearly indicate the general character of their contents. The following new combinations with the name-bearing synonym in parenthesis, new names, and new species are included: *Dichopogon fimbriatus* (*Arthropodium fimbriatum* R. Br.), *Arthropodium milleflorum* (*Anthericum milleflorum* Red.), *Trichopetalum plumosum* (*Anthericum plumosum* R. & P.), *Corynotheca micrantha* (*Asparagus micranthus* Lindl.), *Schoenolirion albiflorum* (*Amblostima albiflora* Raf.), **Schizobasopsis** nom. nov., *S. volubilis* (*Bowiea volubilis* Harv.), *Aloe disticha* Mill. var. *brachyphylla* (*A. Saponaria* (Ait.) Haw. var. *brachyphylla* Baker), *Acanthocarpus mucronatus* (*Xerotes mucronata* R. Br.), *Lomandra effusa* (*Xerotes effusa* Lindl.), *L. Endlicheri* (*Xerotes Endlicheri* Muell.), *L. glauca* (*Xerotes glauca* R. Br.), *L. leucocephala* (*Xerotes leucocephala* R. Br.), *L. obliqua* (*Dracaena obliqua* Thumb.), *L. spartea* (*Xerotes spartea* Endl.), *Gagea villosa* (*Anthericum villosum* Labill.), *Allium cernuum* Roth var. *neo-mexicanum* (*A. neo-mexicanum* Rydb.), *A. Rydbergii, A. jubatum, Bloomeria maritima* (*Hesperoscordium maritimum* Torr.), *B. maritima* (Torr.) Macbr. var. *serotina* (*Muilla serotina* Greene), *B. transmontana* (*Muilla transmontana* Greene), *B. Purpusii* (*Muilla Purpusii* Brandg.), *Brodiaea grandiflora* (*Triteleia grandiflora* Lindl.), *B. capitata* Benth. var. *insularis* (*B. insularis* Greene), *B. coerulea* (*Milla coerulea* Scheele), *B. breviflora* (*Androstephium breviflorum* Wats.), *Bessera tenuiflora* (*Behria tenuiflora* Greene), *Calochortus macrocarpus* Dougl. var. *cyaneus* (*Cyaneus* A. Nels.), *C. macrocarpus* Dougl var. *maculosus* Nels. & Macbr. (*C. maculosus* Nels. & Macbr.), *Scilla hyacinthina* (*Ledebouria hyacinthina* Roth), *Camassia Walpolei* (*Quamassia Walpolei* Piper), *Hyacinthus atroviolaceus* (*Bellevalia atroviolacea* Regel), *Yucca*

Treleasei, Nolina juncea (*Dasylirion junceum* Zucc.), *Dasylirion longistylum, D. recurvatum* (*Beaucarnea recurvata* Lemaire), *D. strictum* (*Beaucarnea stricta* Lemaire), *D. gracile* (*Beaucarnea gracilis* Lemaire), *Cordyline mauritiana* (*Dracaena mauritiana* Bojer), *Asparagus Krausianum* (*Myrsiphyllum Krausianum* Kunth), *A. asparagoides* (L.) W. F. Wight var. *angustifolius* (*Medeola angustifolia* Mill.), *A. Fysoni, Clintonia alpina* (Royle) Kunth var. *udensis* (*C. udensis* Traut. & Mey.), *Smilacina amplexicaulis* Nutt. var. *glabra, S. purpurea* Wall. forma *pallida* (*S. pallida* Royle), *Polygonatum odoratum* (Mill.) Druce var. *ambiguum* (*P. ambiguum Link*), *Trillium Underwoodii* Small var. *luteum* (*T. sessile* L. var. *luteum* Muhl.), *Aletris pauciflora* (Klotsch) Franchet var. *khasiana* (*A. khasiana* Hook. f.), *Luzuriaga polyphylla* (*Callixene polyphylla* Hook.), *Mirabilis tenuiloba* Wats. var. *polyphylla* (*Hesperonia polyphylla* Standley), *M. oligantha* (*Hesperonia oligantha* Standley), *M. californica* Gray var. *cedrosensis* (*Hesperonia cedrosensis* Standley), *M. Heimerlii* (*Hesperonia Heimerlii* Standley), *Mentzelia dispersa* Wats. var. *latifolia* (*Acrolasia latifolia* Rydb.), *M. dispersa* Wats. var. *compacta* (*M. compacta* A. Nels.), *M. congesta* T. & G. var. *Davidsoniana* (*Acrolasia Davidsonia* Abrams), *Tauschia arguta* (*Deweya arguta* T. & G.), *T. Hartwegi* (*Deweya Hartwegi* Gray), *T. Parishii* (*Velaea Parishii* Coult. & Rose), *T. vestita* (*Deweya vestita* Wats.), *T. Howellii* (*Velaea Howellii* Coult. & Rose), *T. fusiformis* (*Museniopsis fusiformis* Rose), *T. biennis* (*Museniopsis biennis* Coult. & Rose), *T. peucedanoides* (*Cnidium peucedanoides* HBK.), *T. drudeophytoides, T. pubescens* (*Museniopsis pubescens* Coult. & Rose), *T. scabrella* (*Museniopsis scabrella* Coult. & Rose), *T. guatemalensis* (*Donnellsmithia guatemalensis* Coult. & Rose), *Lomatium simplex* (*Peucedanum simplex* Nutt.), *L. Nuttallii* (*Seseli Nuttallii* Gray), *L. alpinum* (*Peucedanum graveolens* Wats. var. *alpinum* Wats.), *L. Parryi* (*Peucedanum Parryi* Wats.), *L. Eastwoodae* (*Cynomarathrum Eastwoodae* Coult. & Rose), *L. Brandegei* (*Peucedanum Brandegei* Coult. & Rose), *Ericameria Bloomeri* (*Aplopappus Bloomeri* Gray), *E. fasciculata* (*Chrysoma fasciculata* Eastw.), *Aster deserticola, Perityle megalocephala* (*Laphamia megalocephala* Wats.), *P. Stansburii* (*Laphamia Stansburii* Gray), *P. Toumeyi* (*Laphamia Toumeyi* Rob. & Greenm.), *P. tenella* (*Laphamia tenella* Jones), *P. gilensis* (*Laphamia gilensis* Jones), *P. Lemmoni* (*Laphamia Lemmoni* Gray), *P. trisecta* (*Leptopharynx trisecta* Rydb.), *Bahia integrifolia* (*Schkuhria integrifolia* Gray), *Actinea depressa* (T. & G.) Ktze. var. *pygmaea* (*Actinella depressa* T. & G. var. *pygmaea* Gray), *A. acaulis* (Pursh) Spreng. var. *lanata* (*Actinella lanata* Nutt.), *A. acaulis* (Pursh) Spreng. var. *lanata* forma *caespitosa* (*Tetraneuris acaulis* var. *caespitosa* A. Nels.), *A. acaulis* (Pursh) Spreng. var. *lanata* (Nutt.) Macbr. forma *arizonica* (*Tetraneuris arizonica* Greene), *A. acaulis* (Pursh) Spreng. var. *simplex* (*Tetraneuris simplex* A. Nels.), *A. Torreyana* (*Actinella Torreyana* Nutt.), *A. leptoclada* (Gray) Ktze. var. *Ivesiana* (*Tetraneuris Ivesiana* Greene), *Helenium tinctorium* (*Santolina tinctoria* Mol.), *H. plantagineum* (*Cephalophora plantaginea* DC.), *H. Leguiffei* (*Cephalophora Leguiffei* Phil.), *Monolopia major* DC. var. *gracilens* (*M. gracilens* Gray), *Dyssodia Palmeri* (*Urbinella Palmeri* Greenm.), *Matricaria suffruticosa* (*Tanacetum suffruticosum* L.), *Cirsium californicum* Gray var. *bernardinum* (*Carduus bernardinus* Greene), *Suaeda nigra* (*Chenopodium nigrum* Raf.), *Guatteria boyacana, Duguetia vallicola, Krameria parvifolia* Benth. var. *glandulosa* (*K. glandulosa* Rose & Painter), *K. parvifolia* Benth. var. *imparata, Draba Paysonii, Machaerium Whitfordii, Clarkia Dudleyana* (*Godetia Dudleyana* Abrams), *Cornus californica* C. A. Mey. var. *pubescens* (*C. pubescens* Nutt.), *Rhododendron Warrenii* (*Azaleastrum Warrenii* A. Nels.), *Gilia debilis* Wats. var. *Larseni* (*G. Larseni* Gray), *G. Rawsoniana* (*Collomia Rawsoniana* Greene), *G. effusa* (*Loeselia effusa* Gray), *G. grandiflora* (Dougl.) Gray var. *axillaris* (*Collomia grandiflora* var. *axillaris* A. Nels.), *G. biflora* (*Phlox biflora* Ruiz. & Pav.), *Cryptantha echinosepala, C. quentinensis, C. barbigera* (Gray) Greene var. *Fergusonae, C. intermedia* (Gray) Greene var. *Johnstonii, Pedicularis canadensis* L. var. *fluviatilis* (*P. fluviatilis* Heller), *P. crenulata* Benth. forma *candida*, and *Plantago Parishii*.

1431. Merrill, E. D. **Oreomyrrhis borneensis Merr. sp. nov., an interesting addition to our knowledge of the Malayan flora.** Amer. Jour. Bot. 5: 514–515. *Pl. 36*. 1918.—The author describes and illustrates a new species of *Oreomyrrhis* from specimens collected on Mount Kinabalu, British North Borneo. This species is regarded as an outlying representative of the New Zealand-Australian flora.

1432. Merrill, E. D. **New or noteworthy Philippine Plants, XIV.** Philippine Jour. Sci. Bot. **13**: 263–333. 1918.—The present paper, like the preceding ones of this series, is devoted primarily to the description of new species of which there are 84, distributed in 26 families; these are as follows: *Pandanus subacaulis*, *P. philippinensis* *P. occultus*, *P. acladus*, *P. biliranensis*, *Freycinetia acutifolia*, *F. platyphylla*, *F. botuliformis*, *F. bulusanensis*, *F. apayaoensis*, *Phacelophrynium cylindricum*, *Laportea pendula*, *Elatostema catanduanense*, *Quercus rizalensis*, *Loranthus confertiflorus*, *L. crassilimbus*, *L. Edanoii*, *L. samarensis*, *L. pachycladus*, *L. amplifolius*, *L. ovatibracteus*, *L. Spraguei* (*L. pubiflorus* Merr., not Sprague), *L. palawanensis* (*L. fragilis* Merr., not Sprague), *Elytranthe Acuñae*, *Aristolochia foveolata*, *Myristica mindorensis*, *M. discolor*, *M. nitida*, *M. palawanensis*, *Gymnacranthera macrobotrys*, *Horsfieldia confertiflora*, *H. megacarpa*, *H. oblongata*, *Knema parvifolia*, *K. Alvarezii*, *Aglaia rizalensis*, *A. pyriformis*, *A. puncticulata*, *A. Robinsonii*, *A. tayabensis*, *A. grandifoliola*, *A. lancilimba*, *A. Mirandae*, *A. myriantha*, *A. pallens* (*A. elaeagnoidea* var. *pallens* Merr.), *Chisocheton parvifoliolus*, *Dysoxylum hexandrum*, *D. ilocanum*, *D. panayense*, *Vavaea retusa*, *V. pilosa*, *V. heterophylla*, *V. pachyphylla*, *Canarium microphyllum*, *Santiria elliptifolia*, *Microtropis philippinensis*, *Leea papillosa*, *Saurauia oligophlebia*, *Ternstroemia megacarpa*, *Eurya pachyphylla*, *E. pachyrhachis*, *Vatica pachyphylla*, *Wikstroemia Fenicis*, *W. brachyantha*, *Begonia Edanoii*, *Memecylon elliptifolium*, *Everettia octodonta*, **Acanthophora** *scandens* (a new genus and species of the Araliaceae), *Boerlagiodendron catanduanense*, *Schefflera catanduanensis*, *S. elliptifoliola*, *S. myrianthella*, *Maesa brunnea*, *Diospyros streptosepala*, *Bassia oblongifolia*, *B. Mirandae*, *Linociera remotinervia*, *Mastixia pachyphylla*, *Cyrtandra Alvarezii*, *C. castanea*, *C. multifolia*, *C. microphylla*, *C. longipes*, *C. tenupies* (*C. longipedunculata* Merr., not Rechinger), *Dischidia lancifolia*, *Hoya pentaphlebia*, *H. pubicalyx*, and *Trichosanthes ellipsoidea*.

1433. Rock, Joseph F. **Cyrtandreae Hawaiienses, Sect. Crotonocalyces Hillebr.** Amer. Jour. Bot. **4**: 259–277. *Pl. 18–23.* 1918.—The author has revised the Cyrtandreae of Hawaii, as this group was defined by Hillebrand. Thirteen species, 11 varieties, and 1 form are recognized of which the following are either new or new combinations: *Cyrtandra Knudsenii*, *C. malacophylla* Clarke var. *erosa*, *C. cordifolia* Gaud. var. *gynoglabra*, *C. crassifolia* (*C. Pickeringii* β var. *crassifolia* Hillebr.), *C. mauiensis*, *C. mauiensis* var. *truncata*, *C. tintinnabula*, *C. platyphylla* Gray *typica*, *C. platyphylla* var. *stylopubens*, C. *platyphylla* var. *stylopubens* forma *ovata*, *C. platyphylla* var. *parvilora*, *C. platyphylla* var. *membranacea*, *C. platyphylla* var. *hiloensis*, *C. platyphylla* var. *robusta*, *C. caulescens*, *C. Pickeringii* Gray var. *waiheae*, *C. Pickeringii* var. *honolulensis* (*C. honolulensis* Wawra).

1434. Rydberg, Per Axel. **Rosaceae (Conclusio).** North Amer. Flora 22[5]: 481–533. Dec. 30, 1918.—The present part concludes the author's treatment of the rose family and includes 3 tribes namely, *Kerrieae* with 2 genera, *Kerria* and *Neviusia* each with one species. *Osmaronieae* also with one species, *Osmaronia cerasiformis* (T. & G.) Greene, and *Roseae* with one genus in which 129 species are recognized. The following species are published as new to science: *Rosa nanella*, *R. obtusiuscula*, *R. subserrulata*, *R. Bicknellii*. *R. petiolata*, *R. Aucuparia*, *R. Palmeri*, *R. Treleasei*, *R. texarkana*, *R. subglauca*, *R. conjuncta*, *R. Bushii*, *R. Butleri*, *R. subblanda*, *R. columbiana*, *R. palustriformis*, *R. arizonica*, *R. granulifera*, *R. bidenticulata*, *R. corymbiflora*, *R. Johnstonii*, *R. Eastwoodiae*, *R. Standleyi*, and *R. oligocarpa*. Several hybrid roses are described. This part, pp. 535–560, also contains "Additions and Corrections" to the families Podostemonaceae by G. V. Nash, Crassulaceae by J. N. Rose, Penthoraceae and Parnassiaceae by P. A. Rydberg, Saxifragaceae and Hydrangeaceae by J. K. Small and P. A. Rydberg, Cunoniaceae, Iteaceae, Hamamelidaceae, and Connaraceae by N. L. Britton, Escalloniaceae by J. K. Small, Altingiaceae by P. Wilson, Grossulariaceae by F. V. Coville and N. L. Britton, and Platanaceae by H. A. Gleason. The following new combinations and new species are included: *Micranthes gaspensis* Small (*Saxifraga gaspensis* Fernald), *M. interrupta* Small, *Neodeutzia occidentalis* Rydb. (*Deutzia occidentalis* Standley), and *Connarus Williamsii* Britton.

1435. SCHNEIDER, CAMILLO. **A conspectus of Mexican, West Indian, Central and South American species and varieties of Salix.** Bot. Gaz. 65: 1–14. 1918.—The present conspectus is concerned primarily with forms of the *Pleiandrae* group. About twenty species and thirteen varieties are included of which three species and eleven varieties are either described as new to science or result from a recombination of names.

1436. STANDLEY, PAUL C. **Blepharidium, a new genus of Rubiaceae from Guatemala.** Jour. Washington Acad. Sci. 8: 58–60. 1918.—*Blepharidium guatemalense* Standley is published as the type of a new genus of the tribe *Cinchoneae.* The genus is based on specimens collected by Henry Pittier in the department of Alta Verapaz, Guatemala.

1437. STANDLEY, PAUL C. **A new species of Rondeletia from Mexico.** Jour. Washington Acad. Sci. 8: 126–127. 1918.—*Rnodeletia Rekoi* Standley is described as a new species from the state of Oaxaca.

1438. STANDLEY, PAUL C. **Omiltemia, a new genus of Rubiaceae from Mexico.** Jour. Washington Acad. Sci. 8: 426–427. 1918.—*Omiltemia longipes* Standley is proposed as the type of a new genus of the Rubiceae. The original diagnosis is drawn from specimens collected by E. W. Nelson in the state of Guerrero.

1439. VAN ESELTINE, G. P. **The allies of Selaginella rupestris in the southeastern United States.** Contrib. U. S. Nation. Herb. 20: 159–172. *Pl.* 15–22, *text fig.* 8. 1918.—Descriptions with a key, of *S. rupestris* and 7 allied species endemic to the southeastern states. Two new species, *S. Riddellii* of central and eastern Texas and probably southern Louisiana, and *S. humifusa* of central and southern Florida, are included in this consideration, which is one of a series concerning the *Selaginella rupestris* group.—*Norma E. Pfeiffer.*

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ENTRIES 1440-1681

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. Readers will be interested to know that manuscripts are now in press for all of volume 2. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until the beginning of volume 2, although some of them are shown on cover page 1 of the present issue.

On request the section for Cytology has been restored. Professor Gilbert M. Smith, Madison, Wisconsin, has been made editor for the section. Collaborators will receive full instructions from the Bibliographical Committe concerning the preparation of abstracts for the new section. It will appear in volume 3.

A list of collaborators of Botanical Abstracts will appear from time to time.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. Beginning with volume 2, each odd-numbered page will show as page-heading, the title of the section occurring or beginning on that page.

The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any editor.

An author's index and an index to sections, together with a list of names of abstractors and of serials cited in volume 1 will accompany volume 2, No. 1. No subject index will be supplied until the end of volume 2, there being a single index for the two volumes.

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ENTRIES 1440–1681

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

[Unsigned abstracts are by the editor.]

1440. BAKER, FREDERICK S. **Native plants as indicators of forest planting sites.** Jour. Ecol. 6: 96. Mar. 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—The native vegetation on a given site indicates the chief factors governing the value of that site for forest planting, based on the nature of its root systems, the transpirational activity, and its place in the natural succession. However, the indicator plants react upon the site and must also be taken into consideration in determining its potentiality. —*Frederick S. Baker.*

1441. EMIG, W. H. **The plant geography of the Arbuckle Mountains, Oklahoma.** Jour. Ecol. 6: 95. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—In these studies the plants were grown in glass tubes and were under constant conditions of temperature and illumination. A prepared gaseous mixture containing oxygen in concentration varying between about 0.7 per cent and 14.4 per cent was employed. The root growth of *Prosopis velutina* and *Opuntia versicolar* as well as that of certain other species, in soil with unlike oxygen content, was observed. The results previously obtained, namely, that the roots of *Opuntia* appear to require a better aerated soil for growth than do those of *Prosopis*, were verified. Growth of the roots of cuttings of *Opuntia* and of relatively long *Prosopis* roots ceases promptly in an atmosphere containing less than 1 per cent oxygen, but if there is 10 per cent more or less oxygen in the air of the soil, root growth continues for several hours at a diminishing rate, and at length ceases. The rate of root growth at parallel soil temperatures and in an atmosphere of the same oxygen content is always greater in *Prosopis* than in *Opuntia*. The relation of root growth of relatively young *Prosopis* plants to oxygen appears to be inconsistent, although exactly on what this is based was not learned. A certain, but relatively slow growth rate occurs in the roots of very young *Prosopis* in an atmosphere containing less than 1 per cent oxygen. Under the same conditions the roots of *Covillea tridentata* of the same age either exhibit no growth or very little growth. Thus it is shown that the roots of young and relatively young desert plants show unlike relations to oxygen.—*W. H. Emig.*

1442. HEMSLEY, W. B. **The palms of Seychelles and the Mascarenes.** Nature 101: 73–74. Mar., 1918.—Data obtained largely through communications from P. R. Dupont, for many years curator of the Botanical Station at Mahé in the Seychelles. Palms constitute the most

striking feature of the Seychelles vegetation, and they conspicuously overtop most of the other trees. Endemism in palms reaches its culmination in these islands, some species being confined to a single island; even the genera are much restricted, hardly any of them being found outside these archipelagoes. Interesting notes are given concerning Lodoicea, the best known of the Seychelles palms.

1443. Jeffreys, Harold. **Ecology as a subject for teaching.** New Phytol. 17: 51-53. 1918.—See Bot. Absts. 1, Entry 463.

1444. Korstian, Clarence F., and Frederick S. Baker. **Precipitation as a factor limiting the distribution of Pinus ponderosa scopulorum.** Jour. Ecol., 6: 96. Mar., 1918. [Abstract of paper presented at Pittsburgh meeting, Ecological Society of America.]—After compiling data from a number of cooperative Weather Bureau stations within the range of the Rocky Mountain variety of western yellow pine (*Pinus ponderosa scopulorum*) it is concluded that the amount of precipitation during the summer is a potent factor in limiting its distribution, especially in determining its lower limits and in limiting its occurrence in the Great Basin to small isolated areas and scattered individuals. Annual precipitation curves for stations within the range of the variety show a decided crest occurring during June, July or August, while such a crest is practically lacking for Great Basin stations which otherwise appear comparable.—*C. F. Korstian and F. S. Baker.*

1445. Medsger, Oliver P. **Two months in the southern Catskills.** [New York] Mem. Torr. Bot. Club. 17: 294-300. June, 1918.—A brief account of collections and notes on the vegetation of Slide Mountain, Ulster County, N. Y., and neighboring mountains. Of interest chiefly because this mountain is the highest in the region within 100 miles of New York, and there are noted some altitudinal records for the occurrence of certain species of flowering plants, and types of vegetation from 1000 to 4250 feet, the latter being the summit altitude of Slide Mountain. Among the plants noted are *Picea rubra* in a virgin forest, *Sorbus americana* showing much leaf variation, numerous ferns including *Onoclea Struthiopteris*, *Camptosorus Braunii*, *Aspidium Goldianum* and *Botrychium lanceolatum*, and many typical northern species such as *Acer pennsylvanicum*, *Clintonia borealis*, and *Chiogenes hispidula.*—*Norman Taylor and Geo. D. Fuller.*

1446. Pearsall, W. H. **On the classification of aquatic plant communities.** Jour. Ecol. 6: 75-83. Mar., 1918.—The writer reviews the attempts at classification of aquatic plant communities on the basis of (1) growth form, (2) habit and (3) succession, and expresses his agreement with the last. The development of the succession in aquatic habits is controlled principally by the rate of sedimentation. It is further emphasized that there is no fundamental distinction between aquatic and fen stages, the top number of the aquatic stages being the pioneer community in the fen series. The application of the terminology of Clement's "Plant Succession" to such communities is also discussed and found to be in harmony with Pearsall's ideas, and applicable to the examples cited from English lakes. The principal habitat factors are shown to be: (1) Large variations in the dissolved mineral and organic contents of the water; (2) Variations in the amount and type of sediments deposited and; (3) The physical and chemical nature of the primitive lake floor.

It is concluded that aquatic plants bear no markedly dissimilar relation to the substratum than do plants of terrestrial habit and this is taken as justifying the inclusion of aquatic and terrestrial communities in one unbroken succession. The proposed system of classification therefore makes succession the fundamental idea with growth forms and habitat as factors of importance in considering the distribution of communities and in determining their status.—*Geo. D. Fuller.*

1447. Pearsall, W. H. **The aquatic and marsh vegetation of Esthwaite Water.** Jour. Ecol. 5: 180-202. 1917. *Ibid.* 6: 53-74. *Fig. 12.* Mar., 1918.—This is a detailed study of the vegetation of a narrow lake situated in the Lake District of England. Quantitative data

are presented of depth, composition of water, character of deposits and light intensities at various depths and these data are made graphic in maps and curves. The composition, distribution and succession of the various aquatic communities up to the reed swamp are carefully studied and mapped. The terrestrial hydrophytic vegetation is placed in two subdivisions, the marsh with zonal plant communities bearing no relation to the aquatic succession and the fen composed of communities succeeding aquatic plants as the mud gets above water level. The former contains a variety of swamp associations of the usual type including herbaceous and forest communities, while in the latter three series are distinguished depending upon the rate of sedimentation. All are supposed to begin with the reed swamp and all include associations of various grasses and sedges, while the area of moderate sedimentation has in addition associations known as "carrs," in which shrubs mingle with the herbaceous species of the fen. The "open carr" trees and shrubs form thickets in the fen, *Salix cinerea*, *S. purpurea*, *Alnus glutinosa* and *Betula tomentosa* being most abundant. The same species form the succeeding "closed carr" and with *Alnus rotundifolia*, *Rhamnus frangula* and *Myrica Gale* constitute a dense swamp forest. Emphasis is placed upon the variations in succession due to different rates of sedimentation and interesting observations presented upon the relation of fens to moors.—*Geo. D. Fuller.*

1448. WATSON, W. **Cryptogamic vegetation of the sand dunes of the west coast of England.** Jour. Ecol. 6: 126–143. *3 fig.* June, 1918.—The dunes studied are those of the Devon and Somerset shore and it is shown that their most abundant plants are often mosses or lichens. Such species as *Tortula ruraliformis*, *Camptothecium lutescens*, *Brachythecium albicans*, *Cladonia furcata*, *Peltigera canina* and *P. rufescens* being characteristic of unstable dunes. In brackish hollows associations of *Riccia crystallina* occur, wet hollows are often occupied by Harpidia (*Hypnum*) association and moist depressions by a Brya (*Bryum*) association. Other less important communities occur in various situations. Of all these complete lists of species are given and it is noted that while many of the bryophytes on the dunes have xerophytic characters none can be called xerophytes.—*Geo. D. Fuller.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

[Unsigned abstracts are by the editor.]

1449. ANDREWS, E. F. **Agency of fire in propagation of longleaf pines.** Bot. Gaz. 64: 497–508. Dec., 1917.—Relates the history of two groups of longleaf pine (*Pinus palustris*), which he observed at the upper and northern limits of the species on Lavender Mountain, Georgia, as evidence of the agency of fire in the propagation of this species. One group was burned over in 1915, while the other had not suffered from fire at any time as far as could be seen. Both "plots" were strictly comparable as to soil, and were located on opposite sides of a ravine. In 1913, when the first observations were made both were evenly covered with a dense growth consisting of *Pteris aquilina*, *Tephrosia virginica* together with species of *Andropogon* and sedges. A part of the area that was later burned over had been cleared at one time but on account of the steepness of the slope had been allowed to revert again to native brush and weeds. In 1913 there were five pines visible on this area and four on the other "control." In 1915 soon after a fire 34 longleaf pines were found in the burned area which had been generally invisible before on account of the dense growth of weeds. The fire had swept away all the competing vegetation and left the area to the pines, whose leaves, though scorched and burned off, had sufficiently protected the growing tip to preserve the life of the trees. In the unburned area there were still 4 trees. In 1917, on the area that had been burned there were 66 trees, while on the other only 2 were left.

The evidence of the resistance of the pine seedlings to fire seems somewhat surprising at first, but it is confirmed by several rough experiments on the behavior of the seedlings in ground fires. These showed that the leaves were not at all inflammable and that they are so

arranged as to shield the growing point. To all appearances exposures as long as 8.5 minutes to a brisk fire of chips were not sufficient to cause death to seedlings a few years old.

In general, foresters have a tendency to condemn fires absolutely and such evidence as this deserves careful consideration. It must be noted however that two very important points have been omitted from the discussion. The first is that the reproduction was much the more vigorous in the first place on the burned plot because of the abandoned clearing where the pines found a congenial seed bed years before the fire (rather than any greater seeding toward the open as intimated in the article as the cause of the heavy reproduction there), and second, the resistance of the cambium to fire after the lower needles have dried or fallen was not investigated. Taking it as a whole, the kernel of the matter is found in the last sentence, the italics are the reviewers, ". . . . when forest fires, especially of the minor type known as 'ground fires' and 'brush fires,' occur *at not too frequent intervals*, the immunity of the pines enables them to take the lead in the work of reforestation, and through the gradual elimination of their rivals to become finally the sole possessors of the soil."—*F. S. Baker.*

1450. Blackman, V. H., and R. C. Knight. **A method of controlling the rate of air movement in transpiration experiments.** Ann. Bot. 31: 122, 218. Apr., 1917.—This article deals with a device to produce uniform air currents by means of a fan and a horizontal flue for use in experiments on the rate of transpiration. The usual methods of investigation in still air have not proved satisfactory on account of the difficulty in showing that the air is really still by periodic observations of the speed of air in the vicinity of the plant. The elimination of air currents and other external factors in these experiments by considering relative transpiration rather than absolute transpiration, i.e., the ratio between transpiration by the plant and evaporation from an atmometer, is not altogether satisfactory since the response of the plant and that of the atmometer to air currents are not proportional.

The device described is as follows:—To obtain the steady movement of air which was desired, a special 'air-flue' was constructed, by which the plant could be protected from chance air currents, and at the same time subjected to a current of constant velocity, the velocity being variable at will. The apparatus consisted of a wooden box 2.25 metres long and 60 cm. in height and breadth. In one end, A, is a circular aperture to accommodate the revolving blades of a fan. The other end, B, of the flue is open, and the four walls are extended by means of bent metal sheets to form a bell mouth, so as to reduce to a minimum the formation of eddy currents at the edges of the opening and the consequent irregularities in the air movement through the flue. Near the center of the flue a section of the roof and sides is replaced by sheets of plate-glass; it is in this section, which is 60 cm. long, that the plants under observation are placed. The glass sheet at the top is divided in two, parallel to the long axis of the flue, and the two parts slide in and out. The front sheet also slides up to facilitate the manipulation of the apparatus or plant inside. This sheet is provided with a small, sliding door, 18 cm. square, which is convenient for minor operations not requiring the removal of the whole sheet. The woodwork is painted white so that the light may not be unduly reduced. Air is drawn through the flue by an electrically driven fan working in the aperture. Several fans and motors have been tried, but during long-period experiments it was found that the ordinary fan motor is not sufficiently constant in speed but tends to slow down slightly. The most satisfactory motor was found to be one with a governing mechanism. With this arrangment slow air currents, as low as 5 metres per minute, which have been mostly used, are easily obtainable.—The speed of the air current is estimated by means of an anemometer except in the case of very low speeds, when the rate of movement of smoke through the flue is timed by a stopwatch.—Air movement was tested by atmometer readings under constant conditions of temperature and humidity, and the results of an experiment carried out in a dark room show great regularity and small variation in half-hour periods.—The apparatus has been used and found satisfactory for air movements up to a speed of 25 metres per minute, although the higher speeds are generally not convenient for transpiration experiments. It is stated that by tests of atmometers it has been found desirable to use as high a speed as possible since greater regularity is obtained in this way.—*E. R. Hodson.*

1451. Butterwick, A. J. **Manufacture of matches in Rangoon.** Indian Forester 44: 410–17. Sept. 1918.—Of thirteen species tried for matches only Letpon (*Bombax malabaricum*) and Shuwbyu (*Sterculia foetida*) were found suitable. A description is given of the methods of manufacture.—*Edw. N. Munns.*

1452. Griffin, Alfred A. **Influence of forests upon the melting of snow in the Cascade Range.** Monthly Weather Rev. 46: 324–327. July 1918.—A study was made in 1916 and 1917 of snow melting in the open and in the forest of three areas on the Columbia River at elevations of around 2000 feet, 3000 feet, and 6500 feet. The water value of the snow cover retained by the forest areas amounted to a mean of 7.5 inches lasting on the average 17 days, at some forested stations for more than 42 days. Drifting occurred only on the higher ridges and chiefly in the open though the late snow banks in the forest resembled drifts. Because of the retention of snow on the crowns of trees and the resulting increased evaporation, snow cover reached a greater depth in the open than in the forest. Under dense forest conditions, the depth of snow retained was greater than in the open forest, at least during the latter part of the melting season. The snow remaining in the forested areas at the time the open stations became bare, was equal to 7.5 inches of water, or 30 per cent. of the maximum snow cover. With the forest areas at higher altitudes and with stations located so as to prevent completely the influence of open areas on the forested stations, and vice versa, the effect was found to be noticeably greater than this. The snow retained in the forest after the open ground was bare was the equivalent of 400 acre-feet of water per square mile, sufficient to supply 150 acres of irrigable agricultural land for the entire season. The effect of the forest cover is to spread this 400 acre-feet of retained snow water through a period of 17 days, important in reducing the crest of the flood and in increasing the minimum flow during low water periods. No records of stream flow from these areas were made.

An unusual factor in delaying melting in the Douglas fir type of forest is the protection given by the irregular layer of even very slight bits of moss, twigs, bark and other litter weathered from the trees. These fragments, which in the open would materially hasten melting by absorbing solar heat, in the forest serve as an effective insulation from the warm air currents above the snow. In the more open forest this effect is less prominent.—*Edw. N. Munns.*

1453. Hofmann, J. V. **Natural regeneration of conifers in the Pacific Coast forests of the United States.** Jour. Agric. Res. 11: 1–26. Oct. 1917. [Abstract by Nature in Indian Forester 44: 234–5. May 1918].—Reproduction in the Pacific Coast conifers after a fire depends more upon the seed stored in the surface soil and unburned litter than upon seed from the nearest forested area. Succession is the replacement of the forest almost immediately by the same species as in the original stand and usually in the same proportion. A comment by the editor of *Indian Forester* brings out that this is known to be the case in Indian forests. Severe fires in hardwoods, consisting of oaks, chestnuts, magnolias, and other species, are followed by the replacement of an almost pure forest of *Magnolia campbellii.*—*Edw. N. Munns.*

1454. Narasimhan M. J. **A preliminary study of root-nodules of Casuarina.** Indian Forester, 44: 265–268. June, 1918.—Casuarina has been successfully cultivated in southern India on many of the wild waste lands. It thrives well on poor, sandy soils, in many places growing luxuriously and aiding greatly in preventing the spreading of dunes. So successful has this been that sandalwood trees can now be grown and cultivated on these dunes. Root nodules were found on the *Casuarina glauca, C. Stricta* and *C. quadrivalvis*, many of them large and rather branchy; though soft at first they later became rather woody. Free culture of bacteria from these nodules was made and they were found to fix atmospheric nitrogen: An estimation of the liquid media 35 days after the culture was made showed an increase of 2.7 mg. of nitrogen per 100 cc. of the liquid. It appears that, apart from the usefulness of Casuarina trees in binding loose, sandy soils, the trees exert a very beneficial influence by improving the soil to such an extent that facilities are afforded for the succession of the inland flora.—*Edw. N. Munns.*

1455. ROGERS, C. G. **Big teak in Burma.** Indian Forester, 44: 417-19. Sept., 1918.—Records are given of some of the big teak trees in Burma; one tree having a circumference of 13 ft. 6 in. contained 861.9 cu. ft. of timber.—*Edw. N. Munns.*

1456, SCHLICH, SIR WILLIAM. **The forests of New Zealand.** Canadian For. Jour. 13: 1834. Aug. 1918.—A short account of the timber area and ownership in New Zealand is given, with the amount and value of the exports and imports of 1913. A considerale acreage has been planted to exotics.—*E. N. Munns.*

1457. SPARHAWK, W. N. **Effect of grazing upon western yellow pine reproduction in central Idaho.** U. S. Dept. Agric. Bull. 738. *31 p., 4 pl.* Dec., 1918.—A study was made of the effect of sheep grazing on a number of sample plots on three grazing allotments between 1912 and 1914. Sheep injure forest reproduction by browsing and by trampling. Slight browsing of the needles, of side branches, of the leader or of the bark does practically no damage to the tree, though when repeated it may result in stunted growth or the death of the tree. Severe browsing, as occurs around bed grounds, often kills the seedlings. Trampling usually is not serious. Damage to seedlings more than a year old was negligible, while as high as 100 per cent—an average of about 20 per cent for all plots—were killed when less than one year old. Western yellow pine (*Pinus ponderosa*) was injured the most by browsing, lodgepole pine (*P. contorta*) less so, and Douglas fir (*Pseudotsuga taxifolia*) least. White fir (*Abies concolor*) is practically never browsed. Of 1,782 seedlings killed, 73 per cent were less than a year old, and but 5 per cent were over 6 inches in height.—Injuries which did not result in death were greater late in the season than during the earlier period, due to drying of the forage as the season advanced. Those killed by grazing were greater earlier in the season than later, as the stem breaks more readily when succulent than after lignification has set in. Injury and death increased fairly constantly with increased intensity of grazing, though after a seedling's third year less than 1 per cent per year of the trees is killed by grazing of moderate intensity. More than three times as many seedlings are killed by other causes than by sheep. Drowth, winter-killing, rodents and birds, and fungus diseases, were the chief causes of death, while frost, rodents and birds are responsible for minor injuries. The benefits of sheep grazing to the forest are through the reduction of fire by the destruction of the inflammable material and the aid to natural forest reproduction, which is often overestimated. A number of suggestions for handling sheep grazing in this type of forest include the time to graze, the intensity of grazing permitted, and methods of handling stock. The latter includes herding, the laying out of driveways, salting, watering and bedding.—*Edw. N. Munns.*

1458. TAYLOR, NATHANIEL R. **Rivers and floods of the Sacramento and San Joaquin watersheds.** U. S. Dept. Agric., Weather Bur. Bull. 43. *92 p., illust., maps, diagrams.* June, 1918.—A discussion of the floods in the principal California watersheds from the earliest known up to the present, with gage heights and hydrographs for the main river tributaries. The increasing flood plane is due to increased height and strength of levees along the stream banks and to the increased and constant enlargment of reclamation areas. Erosion and debris from mining have built up the river beds and the streams are no longer as navigable as formerly.—*Edw. N. Munns.*

GENETICS

GEORGE H. SHULL, *Editor*

[Unsigned abstracts are by the editor.]

1459. ADAMETZ, L. **[Hereditary transmission of the "curly wool" character of Caracul sheep in crosses between the Caracul and Rambouillet breeds.]** Zeitschr. indukt. Abstamm. Vererb. 17: 161-202. 1917.—Abst. in Exp. Sta. Rec. 38: 575. June 14, 1918.

1460. ANONYMOUS. **Citrus hybridization.** Jour. Heredity 9: 281. Oct., 1918.—Extensive and comprehensive hybridization of various varieties and species of citrus fruits was begun at Riverside, California in the spring of 1914.—*C. E. Myers.*

1461. ANONYMOUS. **Wanted photographs of twins.** Jour. Heredity 9: 262. Oct., 1918.

1462. BABCOCK, E. B. **Selecting corn seed.** California Agric. Exp. Sta. Circ. 180. *7 p., 3 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 434. April, 1918.

1463. BALL, E. D., AND B. ALDER. **Breeding for egg production. II. Seasonal distribution of egg production.** Utah Agric. Exp. Sta. Bull. 149. *71 p., 29 fig.* 1917.—Abst. in Exp. Sta. Rec. 37: 869–871. Feb. 28., 1918.

1464. BARRUS, MORTIER F. **Varietal susceptibility of beans to strains of Colletotrichum Lindemuthianum (Sacc. & Magn.) B. & C.** Phytopath. 8: 589–614. *5 pl.* Dec., 1918.—Between three and four hundred varieties of beans and related plants belonging to ten species of *Phaseolus*, to two species each of *Vigna* and *Dolichos* and to one species each of *Canavali*, *Vicia*, *Cyamopsis*, *Cicer*, *Pisum* and *Lathyrus*, were experimentally studied over period of eight years with regard to resistance and susceptibility to bean anthracnose, *Colletotrichum Lindemuthianum* (Sacc. & Magn.) B. & C. Anthracnose material for inoculation cultures was obtained from several distinct geographical sources, viz., Germany, Illinois, Louisiana, New York, etc. Reactions with the various hosts inoculated demonstrated practicability of recognizing all these geographically distinct cultures as belonging to two strains, morphologically and culturally indistinguishable. These were designated *alpha* and *beta*.—Six degrees of susceptibility of host to parasite were recognized, but this classification was more or less arbitrary and the classes not especially clear cut. From inoculation data on both field and greenhouse plantings, five groups of hosts were recognized: **ab**, varieties susceptible to both anthracnose strains; **aB**, varieties susceptible to strain alpha only; **Ab**, varieties susceptible to strain beta only; **AB**, varieties showing some resistance (quite marked in some cases) to both *alpha* and *beta* strains; **Miscellaneous**, varieties showing irregularities in susceptibility to both strains.—All attempts to break down host resistance and increase susceptibility by means of heavy fertilization with sodium nitrate, by heavy continued watering, by shading, by drought, and by mechanical injuries to host just before inoculation were unsuccessful, though fully checked by untreated plants. Varieties of beans most resistant to both strains are Wells' Red Kidney, White Marrow and White Imperial, and these are recommended as foundation stocks for producing other desirable resistant commercial varieties. Extensive infection with both strains was secured on teparies (*P. acutifolius* var. *latifolius* G. F.) and black-eyed beans (*Vigna sinensis* (L.) Endl., slight to fair infection on numerous varieties of Lima beans (*P. lunatus*), and slight to no infection on varieties of *Pisum*, *Dolichos*, *P. aureus* Roxb., *P. multiflorus* Willd., *P. aconitifolius* Jacq., *Cyamopsis*, *Canavali*, and sweet peas.—Full descriptions are given of methods, sources of host and parasite material and tables of host varieties tested with their degree of resistance or susceptibility to both strains of anthracnose.—*O. E. White.*

1465. BERGSTRÖM, SVERKER. **Sur les moments de la fonction de correlation normale de *n* variables.** [On the moments of the function of normal correlation of *n* variables.] Biometrika 12: 177–183. Nov., 1918.—See Bot. Absts. 2, Entry 22.

1466. BLARINGHEM, L. **Les complexes végétaux et leurs disjonctions par la vieillesse. [Vegetable complexes and their resolution as a result of aging.]** Ann. inst. Pasteur 32: 60–70. 1918.—Exposition of view that "disjonction" is brought about by physical-chemical conditions incident to age. Applied to bud sports of such chimeras as *Cytisus Adami*, to vegetative segregations of parental characters in known hybrids, to cases of degeneration of plants propagated vegetatively (potato, pear, grape, etc.) and to maturity of such parasitic fungi as smuts and rusts.—Changes in environmental conditions are credited with much influence in

inducing "disjonctions." Reports that a well known flour wheat of Russia changes to durum wheat when grown in Algeria and to still different species (*T. turgidum*) when grown in France, the "disjonction" being induced by differences in soil, heat and humidity which especially influence transpiration.—Maintains that hybrids are frequently mosaics of tissues characteristic of the parents, such condition being reported for hybrid *Triticum monococcum* × *T. durum*. [See Bot. Absts. 1, Entry 1173.]—*A. B. Stout.*

1467. Branford, R. **Some breeding statistics.** Agric. Jour. India 12: 573–578. 1917.—Abst. in Exp. Sta. Rec. 38: 574. June 14, 1918.

1468. Broili, J. **Die Anwendung des Fruchtgürtels bei der Kartoffel. [The use of the fruit-girdle in potatoes.]** Zeitschr. Pflanzenzüchtung 6: 57–60. Mar., 1918.—Describes partially successful attempt to increase berry-production in potatoes, by wrapping stem tightly to check descent of food materials.

1469. Cobb, Frieda, and H. H. Bartlett. **Purple bud sport on pale-flowered lilac (Syringa persica).** Bot. Gaz. 65: 560–562. *1 fig.* 1918.—Abst. in Exp. Sta. Rec. 39: 244. 1918. [See Bot. Absts. 1, Entry 216.]

1470. Collins, E. J. **Potato breeding.** Gard. Chron. 64: 226. Dec. 7, 1918.—Lists numerous varieties that are practically synonymous or at least indistinguishable and suggests that pedigree of each new variety be fully and accurately disclosed.—*Richard Wellington.*

1471. Coulter, John M., and Merle C. Coulter. **Plant genetics.** *19 × 13 cm., ix + 214 p., 40 fig.* Univ. of Chicago Press, Chicago, Illinois. July, 1918.

1472. Crozier, W. J. **Assortive mating in a nudibranch Chromodoris zebra Heilprin.** Jour. Exp. Zoöl. 27: 247–292. *23 fig.* Nov. 20, 1918.—Large individuals mate chiefly with other large ones, small with small. Cause of assortive mating appears to be mechanical. Number of eggs laid at one time is proportional to size of body. Since sperm injected by small individual might not suffice to fertilize all eggs of large one, assortive mating is adaptive, in that larger numbers of fertilized eggs are thereby produced.—*A. F. Shull.*

1473. Davis, B. M. **Some inter- and back-crosses of F_1 Oenothera hybrids.** Genetics 2: 155–185. *6 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 28. Jan., 1918.

1474. Davis, Bradley Moore. **The segregation of Oenothera brevistylis from crosses with Oenothera Lamarckiana.** Genetics 3: 501–533. *7 fig.* Nov., 1918.

1475. Detlefsen, J. A. **Fluctuations of sampling in a Mendelian population.** Genetics 3: 599–607. Nov., 1918.

1476. De Vries, Hugo. **Kreuzungen von Oenothera Lamarckiana mut. velutina. [Crosses of Oenothera Lamarckiana mut. velutina.]** Zeitschr. indukt. Abstamm. Vererb. 19: 1–38. Mar., 1918.—See Bot. Absts. 2, Entry 933.

1477. De Vries, Hugo. **Twin hybrids of Oenothera Hookeri T. and G.** Genetics 3: 397–421. Sept., 1918.

1478. De Vries, Hugo. **Oenothera rubrinervis, a half mutant.** Bot. Gaz. 67: 1–26. Jan. 1919.—See Bot. Absts. 2, Entry 398.

1479. Duerden, J. E. **Absence of xenia in ostrich eggs.** Jour. Heredity 9: 243–245. Oct., 1918.—Reviewing literature, it is well attested that seeds obtained from a cross-pollinated plant frequently show influence of the fertilizing pollen, but evidence of xenia in

poultry is not well authenticated. Recent work by author shows that eggs of North African ostrich, when fertilized by sperms of South African ostrich, a distinct species with eggs strikingly contrasting in size and proportions, and number and extent of pores, and the reciprocal, indicate no evidence of xenia. F_1 ostriches from these crosses reveal intermediate characters in all respects, except that the bald head patch occurring in the northern and absent in the southern is dominant. Eggs of F_1 birds are like those of southern ostrich in size and shape, but pittings are intermediate in number and depth.—*R. K. Nabours.*

1480. Durst, C. E. **Tomato selection for Fusarium resistance.** Phytopath. **8**: 80. 1918. [See Bot. Absts. 1: Entry 93.]

1481. Ebstein, Dr. Erich. **Zur Polydaktylie in einen südarabischen Herrschergeschlecht. [On polydactyly in a south Arabian family of rulers.]** Die Naturwiss. **4**: 603–604. 1915.—Rev. by Hermann W. Siemens in Zeitschr. indukt. Abstamm. Vererb. **19**: 207–208. June, 1918.

1482. Embody, G. C. **Artificial hybrids between pike and pickerel.** Jour. Heredity **9**: 253–256. *Fig. 4–5.* Oct., 1918.—See Bot. Absts. 2, Entry 25.

1483. Federley, Harry. **Die Vererbung des Raupendimorphismus von Chaerocampa elpenor L. [Inheritance of pupal dimorphism in Chaerocampa elpenor L.]** Öfversigt af Finska Vetenskaps- Soc. Förhandlingar **58**: 13. 1915–16.—Rev. by F. Lenz in Zeitschr. indukt. Abstamm. Vererb. **19**: 215–216. June, 1918.

1484. Folsom, Donald. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. **2**: 209–276. *24 fig.* Dec., 1918.—Individuals of two plastic species, *Ranunculus sceleratus* and *R. abortivus*, were grown with different degrees of water supply. All plants were descended from single individual of each species. Direct relation found in first generation between water supply and many structural features, largely disappeared in second generation grown under somewhat different conditions. Ratio of leaf area under amphibious and xerophytic conditions was in one case (second generation of *R. sceleratus*) 17.8 : 2.7. A small third generation of this species to test for heritability of water effects on laminara rea revealed no transmission of such effects. [See Bot. Absts. 2, Entry 1484.]—*J. P. Kelly.*

1485. Gernert, W. B. **Aphis immunity of teosinte-corn hybrids.** Science **46**: 390–392. 1917.—Abst. in Exp. Sta. Rec. **38**: 561. June 14, 1918.

1486. Goldschmidt, R. **Experimental intersexuality and the sex problem.** Amer. Nat. **50**: 705–718. *3 fig.* 1916.—Abst. in Exp. Sta. Rec. **38**: 65. Jan., 1918.

1487. Goldschmidt, R. **On a case of facultative parthenogenesis in the gipsy moth (Lymantria dispar), with a discussion of the relation of parthenogenesis to sex.** Biol. Bull. Woods Hole **32**: 35–43. 1917.—Abst. in Exp. Sta. Rec. **38**: 261. April 22, 1918.

1488. Goodale, H. D. **Winter cycle of egg production in the Rhode Island Red breed of the domestic fowl.** Jour. Agric. Res. **12**: 547–574. 1918.—Abst. in Exp. Sta. Rec. **38**: 876. Aug. 9, 1918.

1489. Goodspeed, T. H., and R. E. Clausen. **An apparatus for flower measurement.** Univ. California Publ. Bot. **5**: 435–437. *Pl. 54, fig. 1.* 1918.

1490. Green, S. N., and J. G. Humbert. **Disease-resistant varieties of tomatoes.** Monthly Bull. Ohio Agric. Exp. Sta. **3**: 43–48. *3 fig.* 1918.—Characteristics which tend to immunity are believed to be cumulative and usually repeated selections are necessary to

secure immunity to high degree. Resistance and immunity most frequently found in commercially unimportant strains or varieties.—Ohio work started in 1911 by selection of tomatoes for resistance to *Fusarium* wilt. Determination of possible resistance was made with seedlings, by sowing in infected soil. Subsequent field tests of strains showing resistance in seed bed gave only one strain that was completely resistant, but its yield was no greater than non-resistant commercial strains, and it was late in maturing. One strain gave an immunity of 87 per cent and was quite satisfactory with respect to earliness and yield. It will be made basis for further work. [Abst. in Exp. Sta. Rec. 38: 843. Aug. 9, 1918.]—*C. E. Myers.*

1491. Haecker, V. **Die entwicklungsgeschichtliche Vererbungsregel in der Völkerkunde. [The developmental law of inheritance in anthropology.]** Zeitschr. indukt. Abstamm. Vererb. 19: 73–78. Mar., 1918.

1492. Hagedoorn, A. C., and A. L. Hagedoorn. **Rats and evolution.** Amer. Nat. 51: 385–418. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 185. June, 1918.

1493. Hagedoorn-La Brand, A. C., and A. L. Hagedoorn. **Parthenogenesis in higher plants.** Teysmannia 27: 643–656. *1 pl.*, 1917.—Abst. in Exp. Sta. Rec. 38: 331. Mar., 1918.

1494. Halsted, B. D. **Colors in vegetable fruits.** Jour. Heredity 9: 18–23. 1918.—Abst. in Exp. Sta. Rec. 38: 443. April, 1918. [See Bot. Abst. 1, Entry 25.]

1495. Halsted, B. D. **Reciprocal breeding in tomatoes.** Jour. Heredity 9: 169–173. 1918.—Abst. in Exp. Sta. Rec. 39: 140. Aug., 1918. [See Bot. Absts. 1, Entry 26.]

1496. Halsted, B. D. **Weight of seeds as related to their number and position in the pod.** Torreya 17: 102–103. 1917.—Abst. in Exp. Sta. Rec. 38: 535–536. June 14, 1918.

1497. Hansen, Albert A. **Petalization in the Japanese quince.** Jour. Heredity 9: 15–17. *2 fig.* Jan., 1918.—Abst. in Exp. Sta. Rec. 38: 446. April, 1918. [See Bot. Absts. 1, Entry 27.]

1498. Harper, R. A. **Organization, reproduction and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 57: 375–439. *Pl. 5–6, fig. 35.* 1918.—See Bot. Absts. 2, Entries 27, 60.

1499. Harris, J. A. **On the distribution of abnormalities in the inflorescence of Spiraea Vanhouttei.** Amer. Jour. Bot. 4: 624–636. *2 pl.* 1917.—Abst. in Exp. Sta. Rec. 39: 30. July, 1918.

1500. Harris, J. A., A. F. Blakeslee, and W. F. Kirkpatrick. **Inter-periodic correlation in the egg production of the domestic fowl.** Proc. National Acad. Sci. U. S. Amer. 3: 565–569. *2 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 171–172. Feb., 1918.

1501. Havas, G. **A herefěléken és más növényeken előforduló azonos rendellenességekről. [On similar cases of teratology in species of clover and in other plants.]** Botanikai Közlemények 1917: 20–23. 1917.—German abst. in Zeitschr. Pflanzenzüchtung 6: 50–51. Mar., 1918.

1502. Hayes, H. K. **Inheritance of a mosaic pericarp pattern color in maize.** Genetics 2: 261–281. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 332. Mar., 1918.—Also in *ibid.* 38: 531–532. June 14, 1918.

1503. Hayes, H. K. **Natural crossing in wheat.** Jour. Heredity 9: 326–330, 334. *fig. 14–15.* Nov., 1918.—Indications of natural crossing in wheat were observed by author in 1916 and 1917 in nursery wheat plots at University Farm, Minnesota Agricultural Experiment Station

and conclusion was then drawn that natural crossing in wheat was more common in the Northwest than had formerly been supposed or that seasons of 1915, 1916 were very favorable for cross pollination. Results now reported are similar to those obtained before and show that in 1917 there was also considerable natural crossing. In Durum and Emmer no crossing was observed but number of plants grown was relatively small (120 altogether). Observed crosses in *Triticum vulgare* lines averaged 1.3 per cent and as cross pollination doubtless occurred as often between plants of same variety as between different sorts conclusion is reached that natural crossing in 1917 was at least 2 to 3 per cent.—*C. A. Gallastegui*

1504. Hayes, H. K., and A. C. Arny. **Experiments in field technique in rod row tests.** Jour. Agric. Res. 11: 399–419. 1917.—Abst. in Exp. Sta. Rec. 38: 429–430. April, 1918.

1505. Hayes, H. K., and D. F. Jones. **The effects of cross- and self-fertilization in tomatoes.** Connecticut State Agric. Exp. Sta. Rept. 1916: 305–318. *2 pl.* 1916.—Abst. in Exp. Sta. Rec. 38: 241–242. April 22, 1918.

1506. Hayes, H. K., and D. F. Jones. **First generation crosses in cucumbers.** Connecticut State Agric. Exp. Sta. Rept. 1916: 319–322. *1 pl.* 1916.—Abst. in Exp. Sta. Rec. 38: 241. April 22, 1918.

1507. Hector, G. P. **Observations on the inheritance of anthocyan pigment in paddy varieties.** Mem. Dept. Agric. India, Bot. Ser. 8: 89–101. *2 pl.* 1916.—Abst. in Exp. Sta. Rec. 38: 29. Jan., 1918.

1508. Hertwig, Paula. **Keimesschädigung durch physikalische und chemische Eingriffe.** [Injury of the germcells by physical and chemical means.] Zeitschr. indukt. Abstamm. Vererb. 19: 79–88. Mar., 1918.

1509. Hodgson, Robert W. **An interesting bud-sport in the Washington navel orange.** Jour. Heredity 9: 301–303. *2 fig.* Nov., 1918.—See Bot. Absts. 2, Entry 31.

1510 Holden, H. S., and Dorothy Bexon. **Observation on the anatomy of teratological seedlings. 1. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. Bot. 32: 513–530. *17 fig.* Oct., 1918.—See Bot. Absts. 1, Entry 1330; 2, Entry 32.

1511. Holmes, S. J., and C. M. Doud. **The approaching extinction of the Mayflower descendants.** Jour. Heredity 9: 296–300, 335. Nov., 1918.—See Bot. Absts. 2, Entry 414.

1512. Horsfeld, F. H. **Longevity in Lily pollen.** Jour. Heredity 9: 90. Feb., 1918.—Abst. in Exp. Sta. Rec. 38: 446. April, 1918. [See Bot. Absts. 1, Entry 32.]

1513. Humbert, E. P. **Inheritance of oil in cotton.** Science 45: 411. 1917.—Abst. in Exp. Sta. Rec. 38: 533. June 14, 1918.

1514. Isserlis, L. **On a formula for the product-moment coefficient of any order of a normal frequency distribution in any number of variables.** Biometrika 12: 134–139. Nov., 1918.

1515. Isserlis, L. **Formulae for determining the mean values of products of deviation of mixed moment coefficients in two to eight variables in samples taken from a limited population.** Biometrika 12: 183–184. Nov., 1918.—See Bot. Absts. 2, Entry 418.

1516. Jelinek, J. **Beitrag zur Technik der Weizenbastardierung.** [Contribution to the technique of wheat crossing.] Zeitschr. Pflanzenzüchtung 6: 55–57. Mar., 1918.

1517. Jennings, H. S. **The numerical results of diverse systems of breeding, with respect to two pairs of characters, linked or independent, with special relation to the effects of linkage.** Genetics 2: 97–154. 1917.—Abst. in Exp. Sta. Rec. 38: 268–269. April 22, 1918.

1518. Jennings, H. S. **Observed changes in hereditary characters in relation to evolution.** Jour. Washington Acad. Sci., 7: 281–301. May, 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 37. Mar., 1918.

1519. Jones, D. F. **The effects of inbreeding and crossbreeding upon development.** Connecticut Agric. Exp. Sta. Bull. 207. *100 p., 12 pl.* New Haven, 1918.—See Bot. Absts. 2, Entry 34.

1520. Kempton, J. H. **A correlation between endosperm color and albinism in maize.** Jour. Washington Acad. Sci. 7: 146–149. 1917.—Abst. in Exp. Sta. Rec. 38: 28–29. Jan., 1918.

1521. Kempton, J. H. **The ancestry of maize.** Jour. Washington Acad. Sci. 9: 3–11. Jan. 4, 1919.—See Bot. Absts. 2, Entry 35.

1522. Kiessling, L. **Über eine Mutation in einer reinen Linie von Hordeum distichum L.** Zeitschr. indukt. Abstamm. Vererb. 19: 145–159. June, 1918.

1523. King, H. G. **Fasciated vegetable marrow.** Gard. Chron. 64: 147. *fig. 57.* Oct. 12, 1918.—One branch of vegetable marrow vine growing on manure heap was fasciated, attaining width of five inches. Four fruits developed from eight pistillate flowers which appeared at node. Heredity of form has not yet been tested.—*John Bushnell.*

1524. Küster, E. **Über Anthocyanzeichnung und Zellenmutation. [On anthocyan pattern and cell mutation].** Ber. Deutsch. Bot. Ges. 33: 536–537. 1915.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 220–221. June, 1918.

1525. Küster, E. **Die Verteilung des Anthocyans bei Coleus-Spielarten. [The distribution of anthocyan in Coleus varieties.]** Flora 10: 1–33. 1917.—Rev. by E. Stein in Zeitschr. indukt. Abstamm. Vererb. 19: 220–221. June, 1918.

1526. La Marca, F. **Un nouvel hybride de greffe. [A new graft hybrid.]** Compt. Rend. Paris 166: 647–649. 1918.—Abst. by F. F. Blackman in Physiol. Absts. 3: 293. July-Aug., 1918. Also by J. Arthur Thomson in Jour. Roy. Microsc. Soc. 1918: 318. Sept., 1918. [See Bot. Absts. 1, Entry 911.]

1527. Lancefield, D. E. **Scarlet, an autosomal eye color identical with sex-linked vermilion.** Biol. Bull. 35: 207–210. Oct., 1918.—Scarlet is a new mutant eye color in *Drosophila melanogaster*, in third chromosome approximately 3 units to left of dichaete. Scarlet is closely similar to old mutant, vermilion, which is sex-linked. Data of Richards [See Bot. Absts. 1, Entry 1287.] and Lancefield taken together put gene for scarlet 3.5 to left of dichaete. Appearing simultaneously with scarlet was another mutant eye color similar to pink. Its gene is in second chromosome and has double effect, producing also a bubble appearance in wings. This stock when pure, had low viability and died out before its gene could be definitely located.—*C. B. Bridges.*

1528. Lécaillon, A. **Sur les caracters speciaux que presentent, aux differents stades de leur developpement, les Bivoltins accidentels qui se produisent chez le Bombyx du Mûrier. [On the special characters presented at different stages of development and the accidental bivoltins produced by them in the silkworm (Bombyx).]** Compt. Rend. 165: 683–685. 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 48. Mar., 1918.

1529. Lippincott, W. A. **A fowl's breeding value.** Country Gent. 82: 10–11. *8 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 775. June, 1918.

1530. Lippincott, William A. **The case of the blue Andalusian.** Amer. Nat. 52: 95–115. Feb.-Mar., 1918.—Abst. by J. Arthur Thomson. Jour. Roy. Microsc. Soc. 1918: 300. Sept., 1918. [See Bot. Absts. 1, Entry 36.]

1531. LUNDBERG, J. F., AND Å. ÅKERMAN. **Observations on the color of seeds originating from spontaneous crossing between two forms of Phaseolus vulgaris.** Bol. Agric. [Sao Paulo] 18: 712–726, 793–807, 928–947. 1917.—Abst. Exp. Sta. Rec. 38: 539. June 14, 1918.

1532. MCARTHUR, CLIFFORD L. **Transmissibility of immunity from mother to offspring in hog cholera.** Jour. Infect. Dis. 24: 45–50. Jan., 1919.—See Bot. Absts. 2, Entry 686.

1533. MAC BRIDE, E. W., AND MISS A. JACKSON. **The inheritance of colour in the stick-insect.** Proc. Roy. Soc. 89: 109–118. 1915.—Rev. by Tine Tammes in Zeitschr. indukt. Abstamm. Vererb. 19: 215. June, 1918.

1534. MACDOWELL, EDWIN CARLETON. **Bristle inheritance in Drosophila. II. Selection.** Jour. Exp. Zool. 23: 109–146. *10 fig.* 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 53. Mar., 1918.

1535. MCFADDEN, E. A. **Wheat-rye hybrids.** Jour. Heredity 8: 335–336. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 735. June, 1918.

1536. MACOUN, W. T. **Apple breeding in Canada.** Agric. Gaz. Canada 5: 126–128. 1918. —Abst. in Exp. Sta. Rec. 38: 446. April, 1918.

1537. MIYAZAWA, B. **Oomugi no mi no iro no iden ni tuite. [On the inheritance of the fruit-color of barley.]** Bot. Mag. Tôkyô, 32: 308–310. Oct., 1918.—In a paper in Bot. Mag., Tôkyô, 30: 359–369 (Nov., 1916) and 31: 27–35 (Feb., 1917), entitled "[On the mosaic segregation of barley hybrids]" (in German and Japanese) author described segregation of black and and white grains in F_1 hybrids of the two barley races, "Sekitori" and "Golden melon," and explained the peculiar segregation on basis of vegetative segregation. He has now found, however, that his former observations were wrong in certain respects. He describes results of his new experiments and concludes that there is no vegetative segregation and that all his results are simply explainable on basis of xenia.—*S. Ikeno.*

1538. MOLYNEUX, E. **Fasciation not inherent.** Gard. Chron. 64: 210. Nov. 23, 1918.

1539. MOORE, C. W. **Self-sterility.** Jour. Heredity 8: 203–207. *3 fig.*, 1917.—Abst. in Exp. Sta. Rec. 38: 426. April, 1918.

1540. MULLER, H. J. **Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors.** Genetics 3: 422–499. *1 fig.* Sept., 1918.

1541. NAFZIGER, T. E. **How sorghum crosses are made.** Jour. Heredity 9: 321–322. Nov., 1918.—See Bot. Absts. 2, Entry 39.

1542. NEWMAN, H. H. **Hybrids between fundulus and mackerel. A study of paternal heredity in heterogenic hybrids.** Jour. Exp. Zool. 26: 391–421. *Pl. 2.* Aug., 1918. [See Bot. Absts. 1, Entry 490.]—Abst. by W. D. Halliburton in Physiol. Absts. 3: 457–458. Nov.-Dec. 1918.

1543. NICE, L. B. **Further observations on the effects of alcohol on white mice.** Amer. Nat. 51: 596–607. 1917.—Abst. in Jour. Roy. Microsc Soc. 1918: 42. Mar., 1918.

1544. PEARL, R. **The selection problem.** Amer. Nat. 51: 65–91. 1917.—Abst. Exp. Sta. Rec. 38: 64. Jan., 1918.

1545. PEARL, R. **Factors influencing the sex ratio in the domestic fowl.** Science 46: 220. 1917.—Abst. in Exp. Sta. Rec. 37: 868. Feb. 28, 1918.

1546. PEARL, R. **Studies on inbreeding. VII. Some further considerations regarding the measurement and numerical expression of degrees of kinship.** Amer. Nat. 51: 545–559. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 65. Jan., 1918. Also in Jour. Roy. Microsc. Soc. 1918: 44. Mar., 1918.

1547. PEARL, R. **Studies on inbreeding. VIII. A single numerical measure of the total amount of inbreeding.** Amer. Nat. 51: 636–639. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 269. April 22, 1918.

1548. PEARL, RAYMOND. **The sex-ratio in domestic fowl.** Proc. Amer. Phil. Soc. 56: 416–436. *3 fig.* 1917.—Abst. in Jour. Roy. Microsc. Soc. 1918: 182. June, 1918.

1549. PHILIPS, A. G. **Satisfactory method of pedigreeing fowls.** Reliable Poultry Jour. 24: 1107–1108, 1174–1176. *5 fig.* 1918.—Abst. in Exp. Sta. Rec. 38: 577. June 14, 1918. [See Bot. Absts. 2, Entry 40.]

1550. PINNEY, EDITH. **A study of the relation of the behavior of the chromatin to development and heredity in teleost hybrids.** Jour. Morphol. 31: 225–291. *14 pl., 88 fig.* Sept., 1918. —In cross between *Fundulus* ♀ and *Ctenolabrus* ♂ many abnormal mitoses occurred, taking form of exaggerated lagging of chromosomes which probably eliminated whole chromosomes from nucleus. Development to advanced stage was common, but only one individual reached stage of hatching. All embryos possessed maternal characteristics, none paternal. In reciprocal cross early mitotic behavior was prevailingly normal, but development ceased during gastrulation.—In *Ctenolabrus* ♀ × *Stenotomous* ♂ early mitotic figures were normal, but a number of vacuoles were in cytoplasm of egg. In large number of eggs of this experiment development proceeded to time of hatching, but none was hatched. Embryos were of maternal type. In reciprocal cross abnormal mitoses predominated, development ceased during gastrulation.—In *Ctenolabrus* ♂ × *Menidia* ♀ abnormal mitoses were frequent. Two embryos hatched. These were of maternal type. In reciprocal early mitoses were normal. Embryos reached advanced stage of development.—Cytological examination showed that egg of *Ctenolabrus* is better adapted to coöperate in mitosis with foreign sperm than eggs of other species used. Cleavage rhythm in hybrids is function of egg. Normal mitoses may occur in crosses in which development does not proceed far. Factor determining character of mitosis is quality of cytoplasm, not peculiarity of yolk of egg. Behavior of chromatin of spermatozöon during segmentation is independent of degree of relation existing between species crossed. With favorable cytoplasmic environment and compatible germ plasms success in development may be expected, but favorable cytoplasmic environment is not enough to bring about this result if germ plasms are not harmonious.—Cause of abnormal chromosome behavior is suggested as real cause of irregular development. In crosses in which nuclear behavior is abnormal greatest success in development occurs in more distantly related species, while in cases where mitotic behavior is normal converse is true. If cytoplasm of egg succeeds in entirely suppressing influence of spermatozoon, normal embryos of maternal type are obtained. There is yet no proof that nuclei of hybrid embryos of maternal type contain unchanged full number of maternal and paternal chromosomes. Appearance of paternal chromatophores indicates retention of paternal chromosomes. Apparent anomalies of first hybrids depend firstly upon effect of cytoplasm on sperm, secondly, reaction between two germ nuclei, and thirdly, variable specificity of effect of cytoplasm toward foreign spermatozoon.—*Mary T. Harman.*

1551. POPENOE, PAUL. **Will morality disappear?** Jour. Heredity 9: 269–270. Oct., 1918.

1552. PRIDHAM, J. T. **Proportion of grain to sheaf as a factor in wheat selection.** Agric. Gaz. New South Wales 28: 91–94. 1917.—Abst. in Exp. Sta. Rec. 38: 342. Mar., 1918.

1553. RAUNKIAER, C. **Über die verhältnismässige Anzahl männlicher und weiblicher Individuen bei Rumex thyrsiflorus Fingerh.** Kgl. Danske Videnskabernes Selskab. Biol. Meddel. 1: 3–17. 1918.

1554. RAUNKIAER, C. **Om Løvsspringstiden hos Afkommet af Bøge med forskellig Løvspringstid. [On leaftime in the descendants of beeches with different leaf times.]** Bot Tidsskr. 36: 197–203. 1918.—See Bot. Absts. 2, Entry 42.

1555. RAUNKIAER, C. **Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung. [On the concept of elementary species in the light of modern genetical investigations.]** Zeitschr. indukt. Abstamm. Vererb. 19: 225–240. *2 fig.* 1918.—See Bot. Absts. 2, Entry 41.

1556. RIDDLE, O. **The theory of sex as stated in terms of results of studies on the pigeon.** Anat. Rec. 11: 510. 1917.—Abst. in Exp. Sta. Rec. 37: 868. Feb. 28, 1918.

1557. RIETZ, H. L., AND L. H. SMITH. **A statistical study of some indirect effects of certain selections in breeding Indian corn.** Jour. Agric. Research 11: 105–146. *24 fig.* 1917.—Abst. in Exp. Sta. Rec. 38: 232–233. April 22, 1918.

1558. RITCHIE-SCOTT, A. **The correlation coefficient of a polychoric table.** Biometrika 12: 93–133. Nov., 1918.—See Bot. Absts. 2, Entry 700.

1559. ROBBINS, R. B. **Some applications of mathematics to breeding problems.** Genetics 2: 489–504. 1917.—Abst. Exp. Sta. Rec. 38: 367. Mar., 1918.

1560. ROBBINS, RAINARD B. **Some applications of mathematics to breeding problems. III.** Genetics 3: 375–389. July, 1918.—General mathematical discussion of expectations in Mendelian population after n generations of breeding according to system indicated, when two linked character differences are involved. Systems of breeding considered include (a) random mating, (b) selection of dominants with respect to one of the linked characters, and (c) self-fertilization. To make formulae apply to independent characters, make linkage $r=1$.

1561. ROBBINS, RAINARD B. **Random mating with the exception of sister by brother mating.** Genetics 3: 390–396. July, 1918.—Mathematical discussion of results of this particular type of breeding in case of monohybrid combination when character involved is independent of sex. Concludes that when brother and sister mating is omitted, progeny in succeeding generations approach fixed proportion of pure dominants, heterozygotes and recessives, as number of generations increases. When only two offspring are in typical family, limiting proportion has larger proportion of heterozygotes than in case of completely random mating, but if typical family contains more than two offspring, proportions of three types in limiting family are same as in random mating.

1562. ROEMER, TH. **Über die Befruchtungsverhältnisse verschiedener Formen des Gartenkohles (Brassica oleracea L.). [On the fertilization relationship of different forms of garden cabbage (Brassica oleracea L)].** Zeitschr. Pflanzenzüchtung 4: 125–141. 1918. Rev. by Richard Freudenberg in Zeitschr. indukt. Abstamm. Vererb. 19: 222–223. June, 1918.

1563. SAUNDERS, EDITH R. **Studies in the inheritance of doubleness in flowers. II. Meconopsis, Althaea, and Dianthus.** Jour. Genetics 6: 165–184. 1917.—Abst. Exp. Sta. Rec. 39: 123. Aug., 1918.

1564. SAX, KARL. **The inheritance of doubleness in Chelidonium majus Linn.** Genetics 3: 300–307. May, 1918.—Investigations on inheritance of doubleness in flowers of other plants briefly reviewed. Reciprocal crosses between a double and single-flowered "wild" plant gave in each case in F_2 approximately 1: 1 ratio. In F_2, seed of F_1 singles gave 109 singles: 24 doubles, while seed of F_1 doubles gave in F_2, 6 singles: 105 doubles. Assuming the 6 F_2 singles from F_1 doubles to be contaminations, results indicate inheritance of doubleness in *Chelidonium* is due to one factor pair with doubleness recessive. Much variation in number of floral parts of double segregates, though no greater than in double ancestors. Negative correlation between petal and stamen number in F_2 is high, due to petalody.—*O. E. White.*

1565. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus-fruit improvement: a study of bud variation in the Washington navel orange.** U. S. Dept. Agric. Bull. 623. *15 × 23 cm., 146 p., 19 pl., 16 fig.* 1918.

1566. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: a study of bud variation in the Marsh grapefruit.** U. S. Dept. Agric. Bull. 697. *112 p., pl.* 1-2, *14 fig.* 1918.

1567. Silver, Allen. **Two interesting hybrids.** Avic. Mag. **10**: 12-14. Nov., 1918.—Seven hybrids between Lesser Redpoll and Twite were bred; only one was reared. Characters of its parents are almost equally merged in it. Also reports and describes three hybrids between ♂ Goldfinch and ♀ Twite.—*L. J. Cole.*

1568. Sô, M., and Y. Imai, **On the xenia of the barley.** Bot. Mag., Tôkyô, **32**: 205-214. Oct., 1918.—Authors made some experiments on hybridization of barley similar to those of Miyazawa (see Bot. Absts. **1**, Entry 1537), and found that segregation in F_1 generation is explainable on basis of xenia, the results of their experiments being thus in perfect accordance with those newly obtained by Miyazawa.—*S. Ikeno.*

1569. Stomps, Th. J. **Über die verschiedenen Zustände der Pangene. [On the different states of the pangenes.]** Biol. Zentralbl. **1917**: 161-177. 1917.—German Abst. in Zeitschr. Pflanzenzüchtung **6**: 53. Mar., 1918.

1570. Stout, A. B. **Fertility in Cichorium intybus: The sporadic occurrence of self-fertile plants among the progeny of self-sterile plants.** Amer. Jour. Bot. **4**: 375-395. *2 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 226. April 22, 1918.

1571. Stout, A. B. **Experimental studies of self-incompatibilities in fertilization.** Proc. Soc. Exp. Biol. and Med., **15**: 51-54. 1918.—Abst. by W. S[tiles) in Physiol. Absts. **3**: 299. July-Aug., 1918. [See Bot. Absts. **1**, Entry 939.]

1572. Tenopyr, Lilian A. **On the constancy of cell shape in leaves of varying shape.** Bull. Torrey Bot. Club **45**: 51-76. 1918.—[See Bot. Absts. **1**, Entries 72, 997.]—On basis of measurements for length-width ratios of leaf cells in *Campanula rotundifolia*, *Lobelia erinus*, two species of *Linum* and common type of *Cichorium intybus*, it is concluded that average cell size for given tissue for any species or variety is a fairly constant and hereditary character. Witloof variety of chicory had larger cells than type. Differences in shapes of leaves on same plant are independent of cell shapes and author states that they are "obviously due to heredity," and that hereditary size of organ is due to factors of periodicity regulating number and direction of cell divisions. [Abst. in Jour. Roy. Microsc. Soc. **1918**: 316-317. Sept., 1918.]—*James P. Kelly.*

1573. Tildesley, M. L. **Preliminary note on the association of steadiness and rapidity of hand with artistic capacity.** Biometrika **12**: 170-177. Nov., 1918.

1574. Trabut, L. **The hybrid origin of alfalfa.** Compt. Rend. Acad. Sci. [Paris] **164**: 607-609. 1917.—Abst. in Exp. Sta. Rec. **38**: 332. Mar., 1918.

1575. Van der Lek, H. A. A. **Biological or physiological races of plant parasites and their economic significance.** Tijdschr. Plantenziekten **23**: 85-98, 137-164. *1 fig.* 1917.—Abst. in Exp. Sta. Rec. **39**: 148. Aug., 1918.

1576. Van Someren, V. G. L. **Melanism in Whydahs.** Avic. Mag. **10**: 40-41. Dec., 1918.

1577. VOGTHERR, KARL. **Über die theoretischen Grundlagen des Variabilitäts- und Deszendenzproblems.** [**On the theoretical foundations of the variability and descendance problems.**] Zeitschr. indukt. Abstamm. Vererb. **19**: 39–72. Mar., 1918.

1578. WARREN, DON C. **Mutations in Drosophila Busckii COQ.** Amer. Nat. **51**: 699–703, 1917.—Abst. in Jour. Roy. Microsc. Soc. **1918**: 192. June, 1918.

1579. WENTWORTH, E. N., AND J. B. SWEET. **Inheritance of fertility in Southdown sheep.** Amer. Nat. **51**: 662–682. 1917.—Abst. in Exp. Sta. Rec. **38**: 574–575. June 14, 1918.—Also in Jour. Roy. Microsc. Soc. **1918**: 179. June, 1918.

1580. WHITING, P. W. **Inheritance of coat-color in cats.** Jour. Exp. Zool. **25**: 539–569. April, 1918. Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. **1918**: 294–295. Sept., 1918.—[See Bot. Absts. 1, Entry 52.]

1581. WHITNEY, D. D. **The relative influence of food and oxygen in controlling sex in rotifers.** Jour. Exp. Zool. **24**: 101–138. *4 fig., 4 diagrams.* 1917.—Abst. by J. Arthur Thomson in Jour. Roy. Microsc. Soc. **1918**: 310. Sept., 1918.

1582. WILLIAMS, C. B. **Some problems of sex ratios and parthenogenesis.** Jour. Genetics **6**: 255–267. *5 fig.* 1917.—Abst. in Exp. Sta. Rec. **38**: 458–459. April, 1918.

1583. WOODS, FREDERICK ADAMS. **Will not morality necessarily improve?** Jour. Heredity **9**: 331–332. Nov., 1918.—See Bot. Absts. 2, Entry 270.

1584. ZIMMER, JOHN T. **Inherited feeding habit of herons.** Jour. Heredity **9**: 271. Oct., 1918.—Author observed that captive young herons were unable to pick up pieces of fish from the floor without several trials, but were unerring when the pieces were placed in a shallow basin of water. This was undoubtedly due to light refraction, since in nature they secure most of their food in shallow water. These herons were unable to profit by experience. Author believes this habit of facility in picking up food from shallow water rather than from the ground is inherited trait.—*R. K. Nabours.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

THALLOPHYTES

1585. SAUVAGEAU, C. **Sur les plantules d'une Laminaire a prothalle parasite (Phyllaria reniformis Rostaf.).** [**Young plants of a parasitic Laminaria.**] Compt. Rend. Paris **166**: 787–789. 1918.—Author gives a brief account of very young stages of *Phyllaria reniformis* found growing on a corraline alga (*Lithophyllum lichenoides*) at Banyuls-sur-Mer. He finds the plantlets springing from a vertical filament of several thin-walled cells wholly imbedded in the calcareous Lithophyllum, and, by similarity and analogy with what he has observed in actual cultures of other Laminariaceae, he interprets this imbedded and apparently parasitic filament as a sexual prothallus with an oogonium at its outer or free end, this oogonium persisting as the basal cell of the Phyllaria plantlet (sporophyte). Whether this unusual mode of existence in a calcareous alga has become a necessary adaptation for the prothallus of *Phyllaria reniformis*; whether it involves apogamy, and how the first penetration of its stone-like host is made, are questions yet to be answered.—*M. A. Howe.*

1586. WOLFE, J. J. **Alternation of generations in Padina.** Jour. Elisha Mitchell Soc. **34**: 78–109. 1918.—In *Padina variegata*, abundant at Beaufort, N. C., the sperms, eggs and

tetraspores are borne upon three separate plants. Tetraspores produce male and female plants in approximately equal numbers, and fertilized eggs produce tetrasporic plants, so that there is an antithetic alternation of generations. Eggs also germinate without fertilization, but the parthenogenetic plants die before reaching reproductive stage.—*Charles J. Chamberlain.*—[See Bot. Absts. 1, Entry 983.]

1587. Murphy, P. A. **The morphology and cytology of the sexual organs of Phytophthora erythroseptica.** Ann. Bot. 32: 115–153. *2 pl.* 1918.—Abst. in Exp. Sta. Rec. 39: 431. 1918. [See Bot. Absts. 1, Entry 573.]

SPERMATOPHYTES

1588. Bailey, L. W., and W. P. Thompson. **Additional notes upon the angiosperms Tetracentron, Trochodendron and Drimys, in which vessels are absent from the wood.** Ann. Bot. 32: 503–512. *1 pl., 9 fig.* 1918.—Authors discuss character of tracheidal tissue in secondary wood of these 3 genera, and in particular the status of certain scalariform vessel-like structures in wood of Drimys, described by Jeffrey and Cole in their criticism of authors' earlier paper on this subject. Term "vessel" is defined, and it is shown that structures in question cannot be regarded as true vessels. Evidence is brought forward that they are not segments of vestigial vessels but are typical tracheids having transitional types of pitting. Such cells occur not only as result of wounding, but normally in stem and root of all 3 genera studied. It is concluded that true vessels do not occur in these genera, and that there is no evidence to show that vessels once did occur in the group and have since been lost. Development of scalariform pitting and other features in structure of wood are discussed and attention is called to similarity of secondary wood of Tetracentron and Trochodendron to that of certain Pteridophyta and older gymnosperms. [See Bot. Absts. 1, Entry 1602.]

1589. Davie, R. C. **A comparative list of fern pinna-traces, with some notes on the leaf-trace in the ferns.** Ann. Bot. 32: 233–245. 1918.—Earlier papers of author on anatomy of fern leaves are here supplemented by a list of 220 species, gathered from a wide range of genera. These species may be classified according to whether pinna supply is of "extra-marginal" or "marginal" type. These types are about evenly divided among the various genera. The grouping of genera so provided accords well with generic boundaries recognized by taxonomists. Conclusion is drawn that adaxial portion of pinna trace is portion dependent on heredity, while abaxial portion is variable in relation to features of individual leaf.—*M. A. Chrysler.*

1590. Hoar, Carl S. **The anatomy and phylogenetic position of the Betulaceae.** Amer. Jour. Bot. 3: 415–435. *Pl. 16–19.* 1916.—Anatomical evidence, chiefly ray structures, leads author to conclude that Betulaceae belong near the base of the dicotyledons. Casuarina is closely related anatomically to Amentiferae and is also regarded as a primitive dicotyledon. [Through rev. by J. M. Coulter, in Bot. Gaz. 65: 198–199. 1918.]

1591. Hodgson, R. W. **An account of the mode of foliar abscission in Citrus.** Univ. California Publ. Bot. 6: 417–428. 1918.—Abst. by T. H. Goodspeed in Bot. Gaz. 66: 75–76. 1918. [See Bot. Absts. 1, Entries 67, 191.]

1592. Holmes, M. G. **A study in the anatomy of hazel-wood with reference to conductivity of water.** Ann. Bot. 32: 553–567. *10 fig.* 1918.—Paper aims to find an anatomical basis for variation in conducting power of wood for water. A statistical method of investigating the constitution of wood from this standpoint is presented, the number, size and distribution of conducting elements of wood being portrayed in graphical form. Stool shoots of hazel were investigated and considerable variation noted in the constitution of wood of first year's growth. In passing from base to apex of shoot, a decrease in total amount of conducting tissue is recorded, and an increase in relative amount of conducting tissue per unit of area of wood.—[See Bot. Absts. 2, Entry 192.]

1593. Jensen, G. H. **Studies on the morphology of wheat.** Washington Agric. Exp. Sta. Bull. 150: 3–31. *5 pl., 75 fig.* 1918.—Author has investigated morphology of reproductive structures in wheat, using 4 varieties,—Bluestem, Marquis, Hybrid and Little Club. No important morphological differences were observed between these, except that primordia of spike are produced near surface of ground in spring varieties and below it in winter varieties. Nothing out of the ordinary was observed in development of microspore and male gametophyte, megaspore and female gametophyte, fertilization and early development of embryo and endosperm Author describes and figures a thin-walled papilla in wall of young microspore, where spore touches tapetum, and suggests that this is the point through which absorption of food material by spore takes place. [Abst. by J. M. Coulter in Bot. Gaz. 66: 288. 1918. Also in Exp. Sta. Rec. 39: 341–342. 1918.]

1594. McClung, C. E. **Some considerations regarding microscopical technique.** Anat. Record 14: 265–282. 1918—Micotechnique is a tool as yet imperfectly developed and merits all the attention we can give. Necessity for immediate fixation should be borne in mind. For this purpose it is better to fix in picro-formal at 38°C. in order to secure rapid penetration, and in Fleming's at 0°C. in order to keep tissue unchanged until fixed. Addition of urea, various sugars snd malic acids aids in fixation, especially nuclear sap. With Flemming's fixed] material short washing gives good mitochondria and poor nuclei, long washing gives the reverse effect. Shrinkage occurs in dehydration, clearing, and infiltration. Therefore great care is essential.—*Farr.*

1595. Noyes, H. A., J. F. Trost, and L. Yoder. **Root variations induced by carbon dioxide gas additions to soil.** Bot. Gaz. 66: 364–373. *9 fig.* 1918.—*Capsicum annuum abbreviatum*, *Lactuca sativa*, *Raphanus sativus* and *Phaseolus vulgaris* were studied. In all cases considerable alteration in shape of root system was induced by treatment of soil with carbon dioxide. Tops were affected much less than roots.—[See Bot. Absts. 1, Entry 1661.]

1596. Ruby, J. **Biological and morphological investigations on the olive and on its varieties cultivated in France.** Ann. Sci. Nat. Bot. 9: 1–286. *86 fig.* 1917.—A "general botanical study" of the olive, including considerable morphological information. [Through abst. in Exp. Sta. Rec. 39: 243. 1918.]

1597. Stanford, Ernest E., and Arno Viehover. **Chemistry and histology of the glands of the cotton plant, with notes on the occurrence of similar glands in related plants.** Jour. Agric. Res. 13: 419–436. *Pl. 42–50.* 1918.—Authors describe occurrence of internal lysigenous glands in primary cortex, secondary cortex, foliage, flower and seed of *Gossypium hirsutum*. Glands in secondary cortex are simpler than the rest and often arise from a single cell. Glands are surrounded by envelope of flattened cells, the contents of which differ chemically according as the plant parts bearing them are normally exposed to light or not. Internal glands of this type are universally present in Gossypium and occur to some extent in the related genera Thespesia, Cienfugosia, Erioxylon and Ingenhouzia. Glands which function as nectaries are also described. These are morphologically distinct from the internal glands. A detailed study is made of chemistry of secretions of the internal glands.

1598. Chamberlain, Charles J. **Foreign pollen in Cycas.** Bot. Gaz. 66: 392. 1918. [Rev. of: Le Goc., M. J. Effect of foreign pollination on *Cycas Rumphii*. Ann. Roy. Bot. Gard. Peradeniya 6: 187–194. *Pl. 13.* 1917.]—In this species ovules reach full size after pollination by *Encephalartos* or *Macrozamia*, but no fertilization takes place and mature seeds show no embryo. Reviewer has previously noted a probably similar situation in *Strangeria*.

1599. Chamberlain, Charles J. **The embryo sac of Aster and Solidago.** Bot. Gaz. 65: 571–572. 1918. [Review of: Palm, Bj. Zur embryologie der gattungen Aster und Solidago. Acta Horti Bergiani 5: 1–18. *27 fig.* 1914.]—Author believes extensive development in anti-

podal region is due to growth of lower megaspores of tetrad, thus disagreeing with previous conclusions of reviewer and Miss Opperman. Reviewer holds author's evidence inconclusive and still maintains that cells in question are antipodals.

1600. Palm, Bj., and A. A. L. Rutgers. **The embryology of Aucuba japonica.** Recueil Trav. Bot. Néerland. 14: 119–126. *12 fig.* 1917.—Authors show that apogamy almost certainly does not occur in this species. [Through rev. by J. M. Coulter in Bot. Gaz. 66: 79. 1918.]

1601. Pfeiffer, Norma E. **The sporangia of Thismia americana.** Bot. Gaz. 66: 354–363. *Pl. 16.* 1918.—Further study of this north temperate zone representative of the Burmanniaceae demonstrates its similarity to most members of the family, in contrast to the apogamous *Burmannia coelistis*. There is usual development of microsporangia, though with marked abortion of sporogenous cells. Of the 4 megaspores produced, 2 outermost lie side by side and, with third, soon degenerate. Innermost megaspore produces a typical angiosperm embryo-sac, in which fertilization probably takes place and gives rise to a well developed embryo (for Burmanniaceae), imbedded in large-celled endosperm. A striking nucellar cap of tissue is a feature of seed.—*N. E. Pfeiffer.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

[Unsigned abstracts are by the editor.]

1602. Bailey, I. W., and W. P. Thompson. **Additional notes upon the angiosperms Tetracentron, Trochodendron and Drimys, in which vessels are absent in the wood.** Ann. Bot. 32: 503–512. *9 fig., pl. 16.* Oct. 1918.—In this continuation of previous studies the authors give evidence to prove that the scalariform tracheary elements, which have been described in traumatic root tissue, of *Drimys colorata*, are not vessel-like structures but are typical tracheides with transitional types of pitting such as occur in various Arthrophyta, Cycadophyta, Pteridospermophyta and Angiospermophyta. The interpretation that regards these elements in Drimys as traumatic recapitulation in a conservative organ is negatived by their occurrence in uninjured stems and roots of *Tetracentron*, *Trochodendron* and *Drimys*. The authors state that there is no structural evidence which might be considered to indicate that these vesselless angiosperms are a reduction series from ancestors with true vessels in their secondary wood, and they conclude that these genera have retained this primitive type of vesselless wood structure, in which respect they resemble some of the calamites, seed ferns and cycadeoids, namely the more primitive gymnospermous phylae, and contrasting in their anatomy with the Coniferophyta. [See Bot. Absts. 1, Entry 1588.]

1603. Chaney, Ralph W. **The ecological significance of the Eagle Creek flora of the Columbia River Gorge.** Jour. Geol. 26: 577–592. *4 fig.* 1918.—The Eagle Creek formation comprises from 500 to 2700 feet of prevailingly pyroclastic rocks exposed in the gorge of the Columbia River. Fossil plants have been collected from 18 localities representing about 80 species. The author discusses their ecologic significance and considers that he has representatives of both xerophytic and mesophytic types, which he interprets as upland oak forests and valley forests of maple, elm, sweet gum, etc. The former physiography is considered to have been of the bajada type and the climate to have been somewhat warmer and drier than prevails at the present time in the region. Because of its relations to the upper Clarno flora of Oregon the Eagle Creek formation is considered to be of upper Eocene age.

1604. Clements, F. E. **Scope and significance of paleo-ecology.** Bull. Geol. Soc. Amer. 29: 369–374. 1918.—A formulation of principles and a plea for the greater emphasis of the ecological aspects of paleontology as interpreted by the ecological results derived from studies of the existing biota.

1605. KRYSHTOFOVICH, A. **Occurrence of the palm, Sabal nipponica, n. sp., in the Tertiary rocks of Hokkaidō and Kyūshū.** Jour. Geol. Soc. Tokyo, 25: 59–66. Dec., 1918.—The presence of a large leafed fan palm in the early Tertiary of Japan in 43° N. Lat., about 8° north of the existing range of palms in that region adds to the problem of the botanist when he attempts an explanation of the almost worldwide distribution of such highly organized monocotyledons as the palms in the Upper Cretaceous and early Tertiary. The present new species, *Sabal nipponica*, is associated with species of *Lastraea, Acrostichum, Dicksonia, Taxodium, Populus, Zelkova, Carpinus, Nelumbium, Alnus, Platanus*, etc., indicating a probable contemporaneity with the Kenai coal-bearing series of Alaska, and adds another to the long list of facts which indicate the great poleward extension of mild climatic conditions in the early Tertiary.

PATHOLOGY

DONALD REDDICK, *Editor*

[Unsigned abstracts are by the editor.]

1606. ARTHUR, J. C. **An outline of the history of Phytopathology.** Science 48: 651–652. 1918.—[Review of Whetzel, Herbert Hice. An outline of the history of Phytopathology.]—"This orderly presentation of the evolution of a science destined to play an increasingly wider and more important part in the affairs of human well-being and achievement is particularly timely. Professor Whetzel has compressed into the hundred and thirty pages of his book a well balanced and helpful outline of the historical aspects of the science. It is a valuable addition to botanical literature."—[See Bot. Abst. 1, Entry 377.]

1607. BRIERLEY, WILLIAM B. **The microconidia of Botrytis cinerea.** Bull. Misc. Inf. Kew 1918: 129–146. *1 pl.* 1918.—Morphology and physiology.

1608. BUTLER, E. J. **Immunity and disease in plants.** Agric. Jour. India (Special Indian Science Congress Number). *P. 10–32.* 1918.—General discussion of susceptibility and resistance based on Indian and other literature.—*L. R. Hesler.*

1609. CAMPREDON D'ALBARETTO, E. **[Simple solutions of copper sulfate against vine mildew.]** Ann. R. Acad. Agric. Torino 40: 13–19. 1918.—2.5 per cent solution of copper sulfate in 5 per cent dextrin is an effective therapeutic. It is to be used in preference to bordeaux only in emergencies. [Through abst in Internat. Rev. Sci. Pract. Agric. 9: 898–899. 1918.]

1610. CASTELLA, F. DE, AND C. C. BRITTLEBANK. **[Notes on downy mildew of the vine in Australia.]** Jour. Dept. Agric. Victoria 15: 685–700. *Fig. 1–2.* 1917.—Record of an epiphytotic in 1917. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 396. 1918. Abst. in Exp. Sta. Rec. 39: 357. 1918.]

1611. CAYLEY, DOROTHY M. **Pseudomonas seminum n. sp., a bacterium injurious to peas in England.** Jour. Agric. Sci. 8: 461–479. *Pl. 4–7.* 1917.—[Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 633–634. 1918.]

1612. COTTON, A. D. **Diseases of parsnips.** Bull. Misc. Inf. Kew 1918: 8–21. *2 pl., 2 fig.* 1918.—"Canker"—A more or less open wound, at first reddish brown in color, which occurs on shoulder or upper part of root, frequently ending in destruction of entire root. Lesions originate in horizontal growth cracks and are augmented by soil fungi, bacteria and animals. Suberization of exposed tissue occurs but no wound-cork develops as in carrots, etc. Cultural practices are thought to account largely for cracking, but use of lime or of salt seems to have reduced it.—Descriptions and synonomy of the following organisms with very brief notes on their destructiveness: *Erysiphe polygoni, Phyllachora pastinacae* (with a revised and corrected description), *Ramularia pastinacae, Cercosporella pastinacea, Plasmopara nivea.* [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 899–900. 1918.]

1613. C[otton], A. D. **[Activities of the] Pathological laboratory.** Bull. Misc. Inf. Kew 1918: 39–42. 1918.—Brief report of diseases prevalent in England in 1917 with special mention of black-currant rust (*Cronaratium ribicola*) and of onion diseases caused by *Botrytis*, *Peronospora* and *Sclerotinia*.—Notes on research in connection with *Sphaerotheca mors-uvae*, *Podosphaera ceucotricha* and *Botrytis cinerea*.—Work on wart diseases [of potato] was mostly without result but "the absolute immunity of certain varieties is a piece of sheer good fortune which has saved the country from a very grave situation."

1614. Edson, H. A. **The importance of disease control to the grower of certified potato seed.** Bull. Wisconsin Potato Growers' Assoc. 3: 21–22. 1918.

1615. Finlow, R. S. **Rhizoctonia in jute: the inhibiting effect of potash manuring.** Agric. Jour. India (Special Indian Science Number). *P. 65–72.* 1918.—Jute (*Corchorus* sp.) is attacked by *Rhizoctonia solani* particularly when grown on laterite red soils. Analyses show such soils to be very deficient in calcium and phosphorus but total per cent of potash is .3. Use of lime on such soil increases yields enormously but does not affect presence of Rhizoctonia. Use of potash (hyacinth ash) gave increased yields (100 per cent better than checks or plots treated with carbonate of soda). Rhizoctonia was rampant throughout the non-potash plots which always contained about ten times as many diseased plants as the potash plots.

1616. Gillespie, L. J. **The growth of the potato-scab microörganism at various hydrogen-ion concentrations as related to the occurrence of potato scab.** [Abstract.] Abstr. Bact. 2: 1. 1918. [See Bot. Absts. 1, Entry 309.]

1617. Gillespie, Louis J., and Lewis A. Hurst. **Hydrogen-ion concentration—Soil type—Common potato scab.** Soil Science 6: 219–236. 1918.—Authors' summary contains the following: "Examination of a large number of soils from northern Maine showed an excellent correlation between hydrogen-ion concentration and occurrence of common potato scab. Soils having a hydrogen-ion exponent as low as 5.2 rarely produced scabby potatoes, soils having exponents much higher generally did produce scabby potatoes. Similar results were found for a few soils of different origin and type. The limiting zone of hydrogen-ion exponent for the potato scab organism appears to be about the same for the soil as had previously been found for culture media.—The characteristic difference of hydrogen-ion exponent between the Caribou and the Washburn loams has been confirmed. The typical Caribou loam has a hydrogen-ion exponent of about 4.8 and is free from scab, whereas the Washburn loam is gen-
hydrogen-ion exponent of about 4.8 and is free from scab, whereas the Washburn loam is gen-
erally less intensely acid (shows larger exponents) and potatoes grown on it are usually scabby.—A considerable number of soils having the exponent 5 are successfully cultivated in potatoes and truck crops without liming, showing that the exponent 7 (which indicates physico-chemical neutrality) can hardly be taken in general as "the rational" end-point in lime-requirement tests. No such standard end-point is suggested, this being left for future determination with specific crops." [See Bot. Absts. 1, Entry 309; 2, Entry 849.]

1618. Graves, Arthur Harmount. **Resistance in the American chestnut to the bark disease.** Science 48: 652–653. 1918.—In vicinity of New York City no trees of *Castanea dentata* were found immune to attack of *Endothia parasitica* but a considerable number of resistant trees were found. Evidence of resistance is based on slow increase of lesion upon inoculation; occurrence of trees in a region long since devastated by the disease; the long period the disease had been present in the trees themselves; extensive development of callus tissue, etc.; grouping of the trees in well defined areas, pointing to a genetic variation; manifestation of resistance by all parts—coppice, twigs, branches, etc.—indicating an inherent conditions.

1619. Hemmi, T. [Japanese.] **[On the gloeosporiose of Caladium.]** Sapporo Nat. Hist. Soc. 7: 41–70. 1918.—Pathological, morphological and cultural studies on *Gloeosporium*

aracearum found on the living leaves of *Caladium* in hot house of Sapporo Agricultural College. Growth on synthetic media compared with that of allied fungi and their strains isolated from many different plants. It grows well on comparatively strong acid media and liquifies gelatin; maximum temperature 37–38°C, optimum 27–28°C. and minimum 6–7°C. —*S. Hori.*

1620. HILLIARD, C. M., AND MILDRED A. DAVIS. **The germicidal action of freezing temperatures upon bacteria.** Jour. Bact. 3: 423–431. 1918.—*B. coli* used but conclusions of interest in connection with over-wintering.—"Intermittent freezing exerts a more effective germicidal action than continuous freezing.—The degree of cold below freezing is not very important in the destruction of bacteria. There is no critical temperature below freezing where germicidal effect is greatly accelerated.—Death-rate is much higher in media frozen solid than in same media not solid and at a slightly lower temperature.".—Crystallization, probably resulting in mechanical crushing is an important germicidal factor at freezing point.

1621. HORI, S. [Japanese.] [**Third report on banana disease in Bonin islands.**] Engei no Tomo [The Horticulturist's Friend] 14: Nos. 9–11. 1918.—Since 1899, by the increased facilities of communication, banana culture in Bonin islands has offered the most profitable industry to the islanders; in 1912, it had attained the magnitude of about 350 acres and was increasing. At the end of 1912, however, banana plants in some parts of the islands suddenly showed an abnormal growth, were dwarfed (2–3 ft.), with small yellowish green leaves. The disease spread with rapidity, all the banana plants of the islands were destroyed during 1913–1915 and sugar cane culture took the place. The author has made voyages several times since 1915 to investigate the cause of the disease and to perform field experiments. It became clear that the disease is not caused by the attack of nematodes, fungi or bacteria, but it is of a purely non-parasitic nature, caused by the deficiency of potash in the soil and the manure of common usage. In the field manure experiment, the plants on those plots where no potash or excessive nitrogen was applied, dwarfed 67–100 per cent, while on the plot manured with an ample quantity of potash by potassium sulphate or wood ashes only 12 per cent. Above all, on the plot to which was applied stable manure with potash the plants attained the best growth with no sign of the disease. In the therapeutic experiment, both diseased plants on the spot and diseases shoots transplanted, mostly recovered by the application of the manure above mentioned.—*S. Hori.*

1622. HOWITT, J. E., AND D. H. JONES. **The more important fungus and bacterial diseases of vegetables in Ontario.** Ontario Agric. Col. Bull. 258: 1–48. *illustr.* 1918.—[Abst. in Internat. Rev. Sci. Pract. Agric. 9: 771. 1918.]

1623. HUTSON, J. C. **Notes on certain plant bugs connected with cotton in St. Vincent.** West Indian Bull. 17: 27–39. 1918.—Biological studies and methods of control of insects instrumental in transmitting the fungi of internal boll disease.

1624. JOHNSON, A. G., AND R. E. VAUGHAN. **Ergot in rye and how to remove it.** Wisconsin Agric. Exp. Sta. Ext. Circ. 94: 1–4. 1918.—A salt brine is prepared of sufficient concentration to float the ergot sclerotia and shriveled kernels which may then be skimmed off. It is necessary to wash the grain after treating to prevent seed injury.—*James G. Dickson.*

1625. JONES, L. R., A. G. JOHNSON, AND C. S. REDDY. **Bacterial blight of barley.** Jour. Agric. Res. 11: 625–643. *Pl. 4, fig. 2.* 1917.—*Bacterium translucens* n. sp. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 631–632. 1918.]

1626. KELLER, G. N. [**Tobacco growing in Ireland** (The experiments in 1916).] Jour. Dept. Agric. Tech. Instr. Ireland 17: 461–466. 1917.—Varieties "Broad leaf burley" and "Irish gold" very susceptible to root rot (Thielavia basicola). [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 64. 1918.]

1627. LIND, J. **Kunstgödning som Middel mod Plantesygdomme. [Artifical fertilization as a means of controlling plant diseases.]** 36 *p.* Kopenhagen, 1917.—A discussion of the possibilities of altering the susceptibility of plants to diseases by the use of artificial fertilizers. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 35–37. 1918.]—*W. H. Rankin.*

1628. LÜSTNER, G. **Feinde und Krankheiten der Gemüsepflanzen. Ein Wegweiser für ihre Erkennung und Berkämpfung. [Insect enemies and diseases of vegetables. A guide for their determination and control.]** Bearbeitet im Auftrage des Herrn Ministers für Landwirtschaft, Domänen *n.* Forsten. *78 p. 43 fig.* Stuttgart, 1917. [Abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 37. 1918.]

1629. MOLZ, E. **[The selection of plants resistant to diseases, animal pests and adverse meterological conditions.** Zeitschr. Pflanzenz. 5: 121–244. 1917.—Compilation. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 554–558. 1918.]

1630. NISHIKADO, Y. **Studies on the rice blast fungus. I.** Ber. Ohara Inst. landwirtschaft. Forsch. 1: 171–218. *Pl. 3–4.* 1918.—Report of work on the strains of *Piricularia* isolated from rice, crab-grass, Italian millet, green foxtail, *Zingiber mioga*, and *Z. officinale* of Japan. By infection and cultural experiments and morphological comparisons, it is proved that: *P. oryzae* causes the blast of rice plant; *P. grisea* is parasitic on crab-grass; *P. setariae* sp. nov. occurs on *Zingiber mioga* and *Z. officinale*. These species of *Piricularia* cannot infect healthy plants other than their respective hosts. *P. oryzae* does not grow in carbon dioxid. In dry conditions, the spores maintain their vitality from the autumn to the next summer, hence spores may be a source of early infection.—*S. Hori.*

1631. NISHIKADO, Y., AND C. MIYAKE. [Japanese.] **[Disinfection of rice grain for the control of the brown spot disease.]** Byo-chu-gai Zasshi [Jour. Plant Protec.] 5^9: 1–20. 1918. —Investigation of hot water treatment of rice seed to prevent brown spot disease caused by *Helminthosporium oryzae.* Since the disease may appear even from seed sown on thoroughly disinfected sand, spore- or mycelium-bearing seed must account for at least 50 per cent of origin of the disease. Spores are killed in 10 minutes in hot water, 51°C., while air dry seed is not injured by treatment 10–15 minutes in 54–55°C. Practically, to prevent the disease, rice seed should be treated at seeding time for 10 minutes at 52°C. or 5 minutes at 54°C. after soaking 24 hours in water of room temperature.—*S. Hori.*

1632. NOWELL, WM. **Internal disease of cotton bolls in the West Indies. II.** West Indian Bull. 17: 1–26. 1918.—Green bug (*Nezara viridula*), leaf-footed bug (*Leptoglossus balteatus*), and cotton stainers (*Dysdercus* spp.), puncture cotton bolls injuring the young seeds; this in turn stops the development of lint and causes the shedding or drying up of bolls. Pea chink (*Edessa meditabunda*) causes little direct injury and does not transmit the internal boll disease.—The 4 fungi of internal boll disease were found in the seeds of 20 species of plants in 7 orders and 15 genera.—Injury to cotton bolls is caused principally by one fungus in one locality and by another in a different locality.—Punctures of the green bug bring about infection with the fungi of internal boll disease only when the bugs are transferred from diseased plants.

1633. NOWELL, WM. **Diseases of economic plants. [Part II of Report on the prevalence of some pests and diseases in the West Indies during 1917.]** West Indian Bull. 17: 96–102. 1918.—Brief notes on occurrence, distribution and prevalence of various diseases of sugarcane, cotton, cacao, lime and other citrus trees, bananas and plantains, maize, coco-nut, onions, pigeon peas, nutmegs, and insects.—Notes on phanerogamic parasites.

1634. PEGLION, V. **[Monilia sp., the cause of a specific gummosis of the apricot tree, in Italy.]** Rend. R. Accad. Lincei, Cl. Sci. fis. mat. e nat. V, 26: 637–641. 1917.—*Sclerotinia cinerea* or *S. laxa*. "The most significant character is the absolute restriction of parasitism to the apricot tree." [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 635–636. 1918.]

1635. Petch, T. **Black rot disease of tea.** Ceylon Dept. Agric. L'f't. 2. *3 p. fig. 2.* 1917. —Chief characteristics of disease are persistence of hanging dead leaves and occurrence of dead leaves united in clusters. The fungus- *Hypochnus* sp., occurs also on *Calophyllum burmanni* and *Hemidesmus indicus*. Infection experiments failed but fungus is thought to be truly parasitic. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 119–120. 1918.]

1636. Petri, L. **[Blepharospora cambivora n. gen. and n. sp., a cause of ink disease in chestnut trees.]** Rend. R. Accad. Lincei, (Cl. Sci. fis. mat. e nat.) V, 26: 297–299. 1917.—Fungus is near the Pythiaceae.—Record of successful inoculations. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 397. 1918.]

1637. Salmon, E. S. **On forms of the hop (Humulus lupulus L.) resistant to mildew (Sphaerotheca humuli (D. C.) Burr.)** Jour. Agric. Sci. 8: 455–460. 1917.—Ten seedlings mostly of Italian origin have been found practically immune to the "biologic form" occurring on hops. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 251–252. 1918.]

1638. Savastano, L. **[Treatment of Fusicladium pirinum var. Eriobotryae, injurious to the Japanese medlar tree.]** R. Staz. Sper. Agrum. e Frut. Acireale Bull. 29: 1–6. *2 fig.* 1917. —Secured control by dormant (?) treatment with strong lime-sulfur solution. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 636–637. 1918.]

1639. Savastano, L. **[The control of a disease of the Japanese medlar caused by Fusicladium pirinum var. eriobotryae.]** R. Staz. Agrum. e Frut. Acireale, Bull. 33: 1–2. 1918.—When the disease is present on branches spray in August with lime-sulfur solution 10–12 per cent, normal density 1.25. The same solution should be used about January 1, *i.e.*, when the disease begins to appear, and February 1. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 901. 1918.]

1640. Schenk, P. J. **Tegen een drietal rozenvijanden.[Against a triad of rose enemies.]** Rosarium 25: 49–52. 1915.—A method of control for mildew which also controls two insects of the rose.—Spray with 2.5 per cent "California mixture," 1 per cent salycilic acid in 1 per cent alcohol with addition of 2 per cent green soap. [Through abst. by O. Von Kirchner in Zeitschr. Pflanzenkr. 28: 41–42. 1918.]—*W. H. Rankin.*

1641. Schribaux. **Resistance du manitoba aux maladies cryptogamiques.** Compt. Rend. Acad. Agric. France 4: 530–532. 1918.—Wheat variety, Manitoba, especially resistant to smut (bunt) and perhaps to rust.

1642. Shear, C. L. **Endrot of cranberries.** Jour. Agric. Res. 11: 35–42. 1917.—A soft rot of berries of *Oxycoccus macrocarpus* caused by *Fusicoccum putrefaciens*. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 254. 1918.]

1643. Stevens, F. L. **Mycology and plant pathology.** Plant World 21: 53–54. 1918. [Rev. of: Harshberger, John W. A text-book of mycology and plant pathology.]

1644. Torrend, C. **[Insect and vegetable parasites of the cacao tree in the State of Bahia, Brazil.]** Broteria, Ser. Bot., 15: 106–127. *4 pl. 1 fig.* 1917. Also *ibid.*, Ser. vulgar zação Sci. 15: 263–279. *4 fig.* 1917.—*Phytophthora faberi* causes fruit rot and *Corticium lilacinofuscum* is epiphytic on green branches. [Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 523–524. 1918.]

1645. Turner, W. F. **Nezara viridula and kernel spot of pecan.** Science 47: 490–491. 1918. [See Bot. Absts. 1, Entry 374.]—Through abst. in Internat. Rev. Sci. Pract. Agric. 9: 1000–1001. 918.

1646. Vaughan, R. E. **Progress in control of plant diseases.** Ann. Rept. Wisconsin State Hort. Soc. 48: 179–186. 1918.

1647. VAUGHAN, R. E., AND A. G. JOHNSON. **Fight grain smuts and blights.** Wisconsin Agr. Exp. Sta. Ext. Circ. 57: 1-4. 1916. Revised, Mar., 1918.—Barley should be soaked two hours in a solution of one pint formaldehyde (40 per cent) in 30 gallons water. Oats, wheat and rye should be soaked five minutes in 1 pint in 30 gallons water, drained and covered for two hours. The grain should be spread out to dry after treatment. Treatment with the smut machine is satisfactory for oats, wheat, and rye.—*James G. Dickson.*

1648. WEIR, JAMES R. **Experimental investigations on the genus Razoumofskya.** Bot. Gaz. 66: 1-31. *Fig. 1-19.* 1918—Cross inoculations and cultural studies were made to determine the range of hosts of this group of mistletoes. *Razoumofskya campylopoda* and *R. cryptopoda*, both occurring on yellow pines, are found to be distinct species. The former was found by inoculation to infect *Pinus resinosa, P. sylvestris* and *P. montana*. *Razoumofskya laricis* Piper infects not only the American species of *Larix* but also *L. europea* and *L. leptolepis*. *Abies grandis, Pinus ponderosa*, and *P. contorta* were infected with difficulty, indicating that this species is primarily a larch parasite. *R. Douglasii abientina*, common on *Abies*, proved to be identical with *R. Douglasii*, common on *Pseudotsuga taxifolia*. Cross inoculations and field observations indicate that this species is of importance only on *Pseudotsuga taxifolia*. The lodgepole pine mistletoe, *R. americana* has as its true host *Pinus americana*, but will attack several other species of hard pines. The hosts of the hemlock mistletoe (*R. tseugensis*) are shown to be *Tsuga heterophylla, T. canadensis* and *Abies lasicarpa*. The negative cultural tests of the different species are also given. The fact that several of these mistletoes readily infect exotic hosts indicates the importance of preventing the accidental importation of mistletoe seeds to the native homes of the hosts. [See Bot. Absts. 1, Entry 1377.]—*H. W. Anderson.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

[Unsigned abstracts are by the editor.]

PERMEABILITY AND DIFFUSION

1649. COLLINS, E. J. **The structure of the integumentary system of the barley grain in relation to localized water absorption and semi-permeability.** Ann. Bot. 32: 381-414. *9 fig.* 1918.—The author gives the results of experiments to show that most of the water absorbed by the barley grain is taken up through the micropylar region rather than through the cuticularized cell-walls. In the micropylar region are special areas that permit the entry of water and here must be sought the apparatus for the remarkable selective permeability which prohibits the entry of mineral acids and most salts but passes water with comparative freedom. Solutes such as iodine and acetic acid barely pass at all through the general surface of the grain but, like water, enter by the restricted region at the micropylar end. Nitric acid, which also penetrates the micropylar end of the grain by selective action, neither destroys the enveloping membrane nor impairs the efficiency of the selective apparatus.

The barley grain does not possess perfect impermeability to any solute tested. After many days sulphuric acid gradually enters if the grains are kept in the solution. It was observed in this connection that the initial concentrating effect of barley upon dilute sulphuric acid is gradually reversed, the solution finally exhibiting a concentration lower than the initial.—Penetration of silver nitrate and of sodium chloride is checked by the outer cuticularized walls. This layer of cutin is permeable to water and solutes only to the extent usually associated with cuticle. If the grain covering is used as a membrane in an osmotic cell slow passage of water will take place for months toward a salt solution, but no salt passes in the reverse direction for a considerable time. The initial absorption of water supplies the need of the embryo; the inner layers in the seed coat form a well constructed system for conveying this water to that part of the grain where it can be accessible to the embryo. The subsequent distribution of liquid in the endosperm follows the paths of enzyme disintegration during germination. It is suggested that the water absorbed and distributed during germination takes up and carries with it the enzymes which digest the reserves.—*S. M. Zeller.*

1650. Crozier, W. J. **Cell penetration by acids. IV. Note on the penetration of phosphoric acid.** Jour. Biol. Chem. 33: 463–470. 1918.—Following a line of work already considerably developed by Harvey, Crozier, and Haas, the author finds that the speed with which H_3PO_4 penetrates the tissues of *Chromodoris* is affected by density of the cells and by quantities of buffer materials present in the cells. A mathematical expression is developed for the curves obtained.

1651. Thoday, D. **Some observations on the behavior of turgescent tissue in solutions of cane sugar and of certain toxic substances.** New Phytol. 17: 57–68. *8 fig.* 1918.—Imbibition by potato tissue in several solutions was determined by the change in weight. The results obtained with cane sugar are essentially the same as those obtained by Stiles and Jörgensen (Ann. Bot. 31: 425). Toxic substances, such as mercuric chloride, mercuric cyanide, osmic acid, chloroform, picric acid and phenol were observed. In M/100 mercuric chloride the initial swelling was greater than in distilled water and the same result obtained with osmic acid (M/100) may be compared with similar results obtained by Stiles and Jörgensen with sulphuric acid.—*S. M. Zeller.*

METABOLISM, ENZYMES, FERMENTATION

1652. Burnett, T. C. **Does the liver secrete a catalase accelerator?** Proc. Soc. Exp. Biol. and Med. 15: 80. 1918.—Indications are furnished that variations in catalase activity in different organs may be due to the presence or absence of accelerators rather than to differences in the catalase content.

1653. Edson, N. A. **The effect of frost and decay upon the starch in potatoes.** Jour. Indust. Chem. Engin. 10: 725–726. 1918.

1654. Watanabe, C. K., and V. C. Myers. **A delicate method of determining invert activity.** Proc. Soc. Exp. Biol. and Med. 15: 142–143. 1918.

DEVELOPMENT

1655. Bioletti, Frederic T., and F. C. H. Flossfeder. **Topping and pinching vines.** California Agric. Exp. Sta. Bull. 296: 371–384. 1918.—Experiments made with the Carignane and Tokay grape showed that topping or pinching the vines during the growing season is harmful. Some varieties growing on very rich soil and others whose fruit buds are mostly produced on the laterals might be benefited by moderate summer pruning. [See Bot. Absts. 1, Entry 734.]—*F. F. Halma.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1656. Parr, Rosalie. **The response of Pilobolus to light.** Ann. Bot. 32: 177–205. 1918. —The writer presents a review of the literature on theories of response which are referred to as invoking (1) intensity difference, (2) ray direction, (3) wave-length, (4) energy. The response of *Pilobolus* to carefully calibrated light of different wave-lengths and intensities was studied. *Pilobolus* responds to light of all regions of the visible spectrum. The presentation time gradually decreases from red to violet. There are no intermediate maxima and minima. The presentation time does not vary in direct ratio with the measured energy value, but in inverse ratio to the square root of the wave frequency. The product of the square root of the frequency and the presentation time diminishes with the decrease in the energy value of the spectral regions, and is an approximate constant for a given light source. The spectral energy in its relation to presentation time may be expressed approximately in the Weber-Fechner formula, if the wave frequencies be made a function of the constant. The relation of the spectral energy to the presentation time may also be approximately expressed by the Tröndle formula, the wave frequencies being made a function of the constant.—*S. M. Zeller.*

TEMPERATURE RELATIONS

1657. FREE, MONTAGUE. **Effect of low temperatures on greenhouse plants.** Brooklyn Bot. Gard. Record 8: 14–17. 1919.—General indications as to the conditions of the plants when, due to coal shortage, the temperature in the houses fell as low as 28–30°F.

1658. KIESSELBACH, T. A., AND J. A. RATCLIFF. **Freezing injury of seed corn.** Nebraska Agric. Exp. Sta. Bull. 163: 1–16. 1918.—The causes of freezing injury of seed corn are late maturity of the corn and abnormally early freezing weather. By selecting early maturing ears or planting seed of some earlier type the damage caused by late maturity can be overcome.—*F. F. Halma.*

TOXIC AGENTS

1659. BRENCHLEY, WINIFRED E. **Organic plant poisons. II. Phenols.** Ann. Bot. 32: 259–278. *18 fig.* 1918.—The phenols suggest possibilities for the partial sterilization of soils. In experiments upon barley and pea plants grown in water cultures, M/100 concentrations of phenols were fatal. In weaker concentrations the toxic action varies considerably for different phenols. Concentrations below a certain limit do not retard plant growth. No signs of stimulation were observed.—*S. M. Zeller.*

1660. HALL, IVAN C., AND LILLIAN J. ELLEFSON. **The elimination of spurious presumptive tests for B. coli in water by the use of gentian violet.** Jour. Bact. 3: 329–354. 1918.—Gentian violet, 1 part in 20,000, and often even 1 part in 100,000, is found to be efficacious in eliminating from the lactose broth cultures many species of bacteria interfering with the usual "presumptive test" for the coli group. The selective inhibiting action was tested on a variety of Gram-positive anaerobes, a group most frequently interfering with the presumptive test, and in these cases it was highly satisfactory. The dye incidentally inhibits also the less important (because less frequently gas-forming) aerobes. Finally, it retards the growth of certain strongly proteolytic forms which, while not fermenting glucose, may nevertheless interfere with the test by producing sufficient alkali to preclude the development of the characteristic red colonies of *B. coli* when the individuals are relatively few.

1661. NOYES, H. A., J. F. TROST, AND L. YODER. **Root variations induced by carbon dioide gas additions to soil.** Bot. Gaz. 66: 364–373. *Fig. 1–9.* 1918.—These experiments were planned primarily to determine the value of soil aeration, or rather the injurious action of carbon dioxide accumulation in the soil. The plants were grown in soil in Wagner pots and CO_2 was introduced subterraneously. The plants employed were *Capsicum annuum abbreviatum*, *Lactuca sativa*, *Raphanus sativus*, and *Phaseolus vulgaris*. All were found to be affected more or less by the addition of carbon dioxide, this action being marked upon the roots. Where 650 cc. of CO_2 was introduced per pot per hour, normal root development ceased. [See Bot. Absts. 1, Entry 1595.]

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

[Unsigned abstracts are by the editor.]

ALGAE

1662. NIEUWLAND, J. A. **Critical notes on new and old genera of plants.—X.** Amer. Midland Nat. 5: 50–52. 1917.—See Bot. Absts. 1, Entry 1421.

FUNGI

1663. ARTHUR, J. C. **Uredinales of Guatemala based on collections by E. W. D. Holway, IV. Puccinia on Carduaceae, Form-Genera and Index.** Amer. Jour. Bot. 5: 522–555. 1918.

—This is the fourth and concluding number of a series of articles with the above general title by the same author. The preceding parts were published in the same journal (Amer. Jour. Bot. 5: 325–336, 420–446, 462–489. 1918). In this series of papers 232 species of rusts distributed on 32 genera are recorded from Guatemala. In the present paper detailed citations of collections and critical notes are given with reference to 41 species of *Puccinia* on Carduaceae, 8 in the form-genus *Uredo*, one in *Peridermium*, and 5 in *Aecidium*. New species are described as follows: *Puccinia Hodgsoniana* on *Eupatorium* by F. D. Kern; *P. solidipes* and *P. basiporula* on *Eupatorium*, *P. ordinata* on *Calea*, *P. semota* on *Gymnolomia*, *P. cornuta* on *Notoptera*, *P. Schistocarphae* on *Schistocarpha*, *P. inaudita* on *Zexmenia*, *P. Coreopsidis* on *Coreopsis* by Jackson and Holway; *Uredo Triniochloae* and *U. Zeugitis* on Poaceae, *U. Fuchsiae* on Onagraceae, *U. Rondeletiae* on Rubiaceae, by Arthur and Holway. The author also describes *Aecidium seriatum* on Euphorbiaceae and transfers *Uredo Trixidis* Kern & Kellerm. to *Puccinia* and *Endophyllum singulare* Diet. & Holw. to *Aecidium*. An index to species and to host plants for the entire series is appended. [See Bot. Absts. 1, Entries 384, 385, 386.] —*H. S. Jackson.*

1664. Cotton, A. D. **Diseases of parsnips.** Bull. Misc. Inf. Kew. 1918: 8–21. *2 pl. 2 fig.* 1918.—See Bot. Absts. 1, Entry 1612.

1665. Fairman, Charles Edward. **New or noteworthy Ascomycetes and lower fungi from New Mexico.** Mycologia 10: 239–264. 1918.—The paper is based on collections made by Paul C. Standley (see Mycologia 10: 34). New species are described of the following genera: *Diatrype*, *Didymella* (2), *Apiosporella*, *Rhabdospora* (2), *Leptosphaeria* (2), *Gibberidia*, *Pyrenophora*, *Hendersonia* (5), *Microdiplodia* (3), *Phyllachora*, *Hysterium*, *Patellea*, *Phoma* (2), *Dothiorella*, *Placosphaeria*, *Coniothyrium*, *Ascochyta*, *Ascochytula*, *Stagonospora*, *Crypotostictis*, *Camarosporium* (2), and *Arthrobotryum*. New varieties are described in the following genera: *Eutypella*, *Leptosphaeria*, and *Coniothyrium* (2). *Teichospora cercocarpi* (Earle) appears as a new combination.—*H. M. Fitzpatrick.*

1666. Gardner, M. W. **Anthracnose of Cucurbita.** U. S. Dept. Agric. Bull. 727. *p. 168.* 1918.—This paper contains a historical presentation of the synonomy of *Colletotrichum lagenarium* (Pass.) Ell. and Halst. [See Bot. Absts. 2, Entry 1037.]—*H. M. Fitzpatrick.*

1667. Neger, F. W. **Experimentelle Untersuchungen uber Rusztaupilze.** Flora 10: 67–139. *Fig. 1–31.* 1917.—The author describes as new *Gyroceras fumagineum* and *Triposporium pinophilum*. *Coniothecium crustaceum* (*Sarcinomyces crustaceus* Lindner) appears as a new combination, the genus *Sarcinomyces* Lindner being reduced to synonomy under *Coniothecium*. What have been considered as conidia in the latter genus the author states is the vegetative body, no mycelium being present, the mycelium formerly attributed to species of the genus being that of other intermingled fungi. The author, furthermore, describes for the species true conidia, which he regards as previously unrecorded. "Dematium II" and "Hormiscium II" are provisionally listed as new. Extensive notes, especially on characteristics in pure culture, are given for all the above forms as well as for *Dematium pullulans*, *Cladosporium herbarum*, *Atichia glomerulosa* Stein, *Fumago vagans* Pers., *F. foothii* Berk. & Dem., and one unidentified species each of *Torula*, *Helminthosporium*, and *Botryotrichum*.

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

[Unsigned abstracts are by the editor.]

1668. Davidson, Anstruther. **Lupinus mollisifolius spec. nov.** Bull. Southern California Acad. Sci. 17: 57. 1918.—A new species of lupine is described from southern California.

1669. Davidson, Anstruther. **Lupinus Paynei spec. nov.** Bull. Southern California Acad. Sci. 17: 58–59. 1918.—The author describes a second shrubby species of lupine from southern California as new to science.

1670. Davidson, Anstruther. **Additions to the local flora.** Bull. Southern California Acad. Sci. 17: 60–61. 1918.—Several additions to the local flora of southern California are placed on record.

1671. Hayata, Bunzo. **Icones Plantarum Formosanarum nec non et Contributiones ad Floram Formosanum.** *Roy 8 vo. Vol. vii, p. 107, pl. I–IV, fig. 69.* Taihoku, Mar. 25, 1918.—Approximately two hundred and seventy-five species and varieties, mostly flowering plants belonging to eighteen families, are treated in the present volume. The following species and varieties are described as new: *Stellaria reticulivena, Thea hozanensis, T. Nakaii, Rubus suishaensis, R. arisanensis* var. *horishaensis, R. Somai, R. linearifoliolus, Photinia daphniphylloides, Abelia ionandra, Galium Morii, G. tarokoense, Diospyros Sasakii, Euphorbia tarokoensis, Ficus kakauensis, F. ochobiensis, F. tannoensis, Quercus spinosa* David var. *Miyabei, Q. tarokoensis, Juniperus formosana* Hay. var. *concolor, Podocarpus nankoensis, Liparis keitaoensis, Trillium Morii, Allium morrisonense, Paspalum akoensis, P. distichum* L. var. *anpinense, Isachne heterantha, I. arisanensis, Panicum pseudodistachyum, P. barbipedum, P. suishaense, Spodiopogon tohoensis, S. hogoensis, S. Takeoi, Pollinia geniculata, P. Fauriei, P. arisanensis, P. formosana, Pollinopsis Somai, Andropogon kwashotensis, Agrostis suizanensis, A. transmorrisonensis, A. sozanensis, A. morrisonensis, Muehlenbergia arisanensis, Calamagrostis formosana, C. morrisonensis, Brachypodium formosanum, Polystichum Morii, Selaginella kelungensis, S. subcaulescens, S. pseudo-involvens*, and *S. Somai*. One new genus is also proposed namely, **Pollinlopsis** of the Gramineae. The total number of species of the Formosan flora, so far as known, is 3359, which is indicative of the relatively rich and varied flora of that country.

1672. Hitchcock, A. S., **Generic types with special reference to the grasses of the United States.** Amer. Jour. Bot. 5: 248–253. 1918.—The author discusses the subject of generic types, presents certain definitions and principals relative to the selection of type species, and illustrates by examples drawn from the grasses.

1673. Leechman, Alleyne. **The genus Rhizophora in British Guiana.** Bull. Misc. Inf. Kew. **1918**: 1–8. 1918.—The author recognizes three species of *Rhizophora* growing along the coast in the neighborhood of Georgetown, British Guiana. One of these, *R. Harrisonii*, is described as new to science.

1674. Maxon, William R. **A new Anemia from Mexico.** Jour. Washington Acad. Sci. 8: 199–200. 1918.—*Anemia Makrinii* Maxon is described as a species new to science from the state of Oaxaca.

1675. Maxon, William R. **A new Selaginella from Oklahoma and Texas.** Proc. Biol. Soc. Wash. 31: 171–172. Dec. 30, 1918.—*Selaginella Sheldoni* is described as a new species of the *S. rupestris* group.

1676. Pegler, A. **On the flora of Kentani.** Ann. Bolus Herb. 2: 163–184. 1918.—In the present article the author continues the enumeration of the plants of Kentani, listing nearly 600 species and varieties of flowering plants, ferns, and lycopods.

1677. Ricker, P. L. **A synopsis of the Chinese and Formosan species of Albizzia.** Jour. Washington Acad. Sci. 8: 242–246. 1918.—The author records twelve species of *Albizzia* from China and Formosa. The following are either described as new or given new specific names: *Albizzia Meyeri, A. Henryi*, and *A. corniculata*.

1678. Ricker, P. L. **A sketch of botanical activity in the District of Columbia and vicinity.** Jour. Washington Acad. Sci. 8: 487–498. 516–521. 1918.—The author presents a historical account of floristic botany of the District of Columbia and vicinity and a compiled bibliography of the taxonomic literature dealing mainly with the flowering plants and ferns of the same region.

1679. Sargent, C. S. **Notes on North American trees. III. Tilia. II.** Bot. Gaz. **66**: 494–511. 1918.—In continuation of his treatment of the North American lindens the author recognizes and describes eight additional species and seven varieties, including the following which are characterized as new to science: *Tilia caroliniana* Miller var. *rhoophila*, *T. texana*, *T. texana* var. *grosseserrata*, *T. phanera*, *T. phanera* var. *scabrida*, *T. lasioclada*, *T. heterophylla* Ventenat var. *Michauxii*, *T. heterophylla* Ventenat var. *nivea*, *T. heterophylla* Ventenat var. *amphiloba*, *T. monticola*, *T. georgiana*, and *T. georgiana* var. *crinita*.

1680. Standley, Paul Carpenter, **Rubiales. Rubiaceae (pars).** North Amer. Flora **32**[1]: 1–86. Dec. 28, 1918.—Three tribes of the Rubiaceae are elaborated in the present part namely, *Condamineeae* with eight genera and twenty-eight species, *Oldenlandieae* with six genera and fifty-three species, and *Rondeletieae* with six genera and one hundred and nineteen species. The following new combinations with the name-bearing synonym in parenthesis, and new species are included: *Chimarrhis ferruginea* (*Rustia ferruginea* Standley), *Portlandia Shaferi*, *P. albiflora* Britt. & Harris, *Isidorea cubensis*, *Clavenna tetrandra* (*Peplis tetrandra* L.), *Houstonia floridana*, *H. procumbens* (*Anonymos procumbens* Walt.), *Neomazaea Shaferi*, *Acrosynanthus parvifolius* Britton, *A. latifolius*, *A. lucidus* Britton, *A. trachyphyllus*, *Rondeletia Ehrenbergii* K. Schumann, *R. Langlassei*, *R. darienensis*, *R. aspera*, *R. Bourgaei*, *R. pansamalana*, *R. Galeottii*, *R. Deamii* (*Bouvardia Deamii* Donn. Smith), and *R. costaricensis*.

1681. Suksdorf, Wilhelm, **Cardamine oligosperma and its near allies.** Rhodora **20**: 197–199. 1918.—This article includes two new combinations namely, *Cardamine lucens* (*C. oligosperma* var. *lucens* G. S. Torrey) and *C. bracteata* (*C. hirsuta* subsp. *oligosperma* var. *bracteata*. *O. E. Schulz*).

INDEX OF AUTHORS' NAMES

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Vol. 2 MARCH, 1919 No. 1

ENTRIES 1-218

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until later.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief.

Title page, author index, etc., for volume 1 of Botanical Abstracts will accompany volume 2, no. 2.

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Vol. II — MARCH, 1919 — No. 1

ENTRIES 1-218

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1. [ANONYMOUS.] **Milwaukee Public Museum.** Museum Work 1: 101. Jan. 1919.—Botanical exhibit, opened to public in Oct., 1918, contains systematic collection of fungi, mainly mushrooms from Wisconsin, both dried and wet preparations, and 50 groups of wax casts of fleshy fungi; a considerable series of exhibits of economic botany, from crude products to manufactured articles, ultimately to be arranged by botanical families; 54 models of entire plants, each representing a distinct family; numerous enlarged models of parts; 37 garden vegetables. Also a series of ten "war garden" vegetables, illustrating their more common fungus and insect pests, with labels giving directions for treatment; a perennial cut flower exhibit of wild and cultivated plants.—*C. Stuart Gager.*

2. MINER, RALPH WALDO. **Educational training of museum instructors.** Museum Work 1: 114-117. Jan., 1919.—A pedagogical training is of great assistance to a museum instructor who has had a course of training in actual practice of the museum, and who also possesses natural qualities of enthusiasm, tact, and personality. Discussions by Alice W. Kendall, Louise Connolly and Gertrude Underhill, all emphasizing necessity of pedagogical training for museum docents.—*C. Stuart Gager.*

3. REA, PAUL M., AND AGNES L. VAUGHAN. **The development of museum instruction What American museums are doing.** Museum Work 1: 109-113. Jan., 1919.—Paper read at museum instructors session of American Assoc. of Museums, May, 1918. Gives outline of educational activities, (in addition to public exhibits) of Amer. Museum Nat. Hist. (New York City), Arnot Art Gallery (Elmira, N. Y.), Boston (Mass.) Museum of Fine Arts, Children's Museum (Boston), Cleveland (Ohio) Museum of Art, John Herron Art Institute (Indianapolis, Indiana), Metropolitan Museum of Art (New York City), Newark (N. J.) Museum, Park Museum (Providence, R. I.), San Diego (Calif.) Museum, Syracuse (N. Y.) Museum of Fine Arts, and New Jersey State Museum (Trenton).—*C. Stuart Gager.*

4. ROWE, L. EARLE. **Practical training of museum instructors.** Museum Work 1: 122-126. Jan., 1919. Discussions by Deborah Kallen and Edith R. Abbott.—*C. Stuart Gager.*

5. VAUGHAN, AGNES L. **Special training of museum instructors.** Museum Work 1: 118-122. Jan., 1919.—Histrionic training in posture, voice, gesturo desirable. Discussions by ANN E. Thomas and Eva W. Magoon.—*C. Stuart Gager.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

6. BAKER, FREDERICK S. **Aspen as a temporary forest type.** Jour. Forestry 16: 294–303. *3 fig.* Mar., 1918.—The author's studies were undertaken largely to test the recently expressed view of FETHEROLF that the aspen (*Populus tremuloides*) is a permanent rather than a temporary forest type in the Great Basin. It is admitted that many stands are not ephemeral, but it is concluded that "there is no evidence that the aspen by itself or by means of associated fungi and biotic factors is able to withstand invasion by white fir or Douglas fir." Its prominence must be accounted for by repeated fires, which have eliminated conifers and favored aspens, because the latter exhibit sprout reproduction. Thus the aspen is a temporary or successional type in the Great Basin as elsewhere. [See also Bot. Absts. 1, Entry 252.]—*H. C. Cowles.*

7. BEWS, J. W. **The grasses and grasslands of South Africa.** *15 × 22 cm., vi. + 161 p. 24 fig., 1 map.* Davis & Sons: Pietermaritzburg. 1918. ($2.00.)—The first part of the volume is devoted to a series of keys for the identification of the 500 species of grasses which form so conspicuous a portion of the flora. In the remainder of the book are discussed; (1) the sources of the structural and ecological characteristics of the principal species; (2) the general character of the grasslands and the development of the various association types and, (3) the economic application of the ecological principles involved. There are types comparable to the "short grass," "wire grass" and prairie grass of North America, as well as a tall, coarse *Andropogon* association (this last developing upon potential woodland areas) and a mountain tussock grassland. The discussion of the successional relations of these and other association types into which grasses enter, gives a comprehensive general sketch of the plant communities of the major portion of South Africa.—In the final chapter the feeding value of the different types of grassland as well as the comparative merits of native and introduced species is discussed. The effect upon the productivity of various types of grassland by various kinds of grazing and the results from grass burning are considered, and some of the ecological problems involved are pointed out. An appendix contains a list of English, Dutch, Zulu and Sesuto names of the more important species.—*Geo. D. Fuller.*

8. BOUYOUCOS, GEORGE J., AND M. M. MCCOOL. **Determining the absolute salt content of soils by means of the freezing-point method.**—Jour. Agric. Res. 15: 331–336. Nov., 1918.—When the soil is approximately saturated with water the freezing point was found to afford an indirect means of measuring the salt contents of the soil.—*H. L. Shantz.*

9. DRUDE, O. **Licht- und Wärmestrahlung als ökologische Standortsfaktoren. [Light and heat irradiation as ecological factors.]** Flora 111, 112: 227–267. *2 fig.* 1918.—The major portion of the article is occupied with a critical discussion of the theories concerning the relation of heat-rays and light-rays to the structure of the leaf and to the ecology of the plant. Author believes that those structures, especially in the leaf, which are characteristic of plants of xerophytic formations are to be regarded as a protection against too great heat absorption and the accompanying high transpiration, while the assimilation in leaves thus protected is favored by the solar irradiation and would not reach the optimum in diffuse light. He supports his views by a limited number of heat measurements made with ordinary thermometer, black-bulb thermometer, and black-bulb thermometer *in vacuo* at altitudes of 1100–1200 m., where the temperatures in fully insolated tufts of low plants may exceed the temperature *in vacuo* and be as much as 37° above the temperature of the air. Even slight differences of exposure, such as the shade of a rock, may offset completely the effect of insolation and account for the radically different vegetation in such locations. At timber-line the trees may live in temperatures as high as 25° or 30° and the grasses as high as 40° even in September, which may account for the high altitudes reached by certain low-growing ruderal species.

Author did not attempt to measure the actual internal temperature of such plants. He develops a formula for determining the effective maximum temperatures for insolated plants by subtracting the black-bulb temperature from the temperature *in vacuo*, multiplying it by the percentage of sunshine and adding the result to the black-bulb temperature. Averaging this with the nocturnal minimum gives the daily mean, which is found to be (for five days in June) 6° higher than the usual figure.—*H. A. Gleason.*

10. ELMORE, C. J. **Changing diatoms of Devil's Lake [North Dakota].** Bot. Gaz. 65: 186–190. Feb., 1918.—The author discusses the phenomenon of the changing diatoms of Devil's Lake, North Dakota, and the smaller lakes in its vicinity. These small lakes were formerly part of the main lake but have been separated from it by the lowering of the water. Devil's Lake, which was formerly a fresh-water lake fed by streams is passing through a rapid transition. The water is becoming salt, however the salinity differs from that of the sea. It also differs somewhat in different parts of the lake and at different seasons of the year. Of the 56 species of diatoms identified by the author, 25 are genuine fresh-water species; 20 are found in fresh or brackish water; 2 in fresh, brackish, or salt-water; 2 in brackish or salt-water; and 4 marine. The presence of the marine species may be due to importation by migratory birds. The 25 fresh-water species present the greatest anomaly for there is nothing in their appearance to indicate that they have been modified by the change in environment. This fact would seem to confirm what has been observed elsewhere that many diatoms adapt themselves readily to changes in environment.—*Elizabeth Dorothy Wuist Brown.*

11. EMOTO, Y. **On the relative efficiencies of cross and self fertilization in some plants.** [Title in English, text in Japanese.] Bot. Mag. Tôkyô 32: 153–186. *2 fig.* June, 1918.—Results of fertilization in flowering plants are markedly different according to mode of pollination. Materials used were selected from the most common cultivated plants of Japan, belonging to Cruciferae, Iridaceae, Liliaceae and Primulacae. Usually results (size of fruit, weight of seed etc.) are best when different individuals share in cross fertilization although in *Tritonia aurea*, fertilization by pollen of the same individual results in greater percentage of fertilized flowers than when fertilization is by pollen of another individual. Self fertilization sometimes brings good results for length of fruit in *Primula obconica* and for weight of seed in *Brassica campestris, Hyacinthus orientalis, Freesia Leichthini* and *Tritonia aurea.* In *Primula sinensis*, fruits produced by flowers having long stamens when pollinated by flowers with short stamens are better in size and weight of seed than either those produced by flowers of the latter when pollinated by the former, or those produced by crossing the same kind of flowers.—*K. Morita.*

12. JEFFREYS, HAROLD. **On the rarity of certain heath plants in Breckland.** Jour. Ecol. 6: 226–229. Nov., 1918.—The author records the result of an experiment in the transfer of *Nardus stricta, Deschampsia flexuosa* and *Molina coerulea,* plants common to most of the heaths of England, to the more exposed and more xerophytic conditions of the Breckland heath of Suffolk. Plants transferred to the drier areas proved incapable of surviving but *Nardus* and *Molina* appeared to be quite able to hold their own upon damper parts of the same heath when they were protected from the attacks of rabbits.—*Geo. D. Fuller.*

13. MOORE, GEORGE T. **Algological notes: III. A wood-penetrating alga, Gomontia lignicola, n. sp.** Ann. Missouri Bot. Gard. 5: 211–224. *Pl. 13–15.* 1918.—See Bot. Absts. 1, Entry 766.

14. SETCHELL, W. A. **Parasitism among the red algae.** Proc. Amer. Phil. Soc. 57: 155–172. 1918.—See Bot. Absts. 1, Entries 767, 1376.

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

15. Birch, D. C. **Extra costs of logging National Forest stumpage.** Jour. Forestry 16: 909–914. December, 1918.—The extra expense in logging government stumpage is due to "(1) increased construction cost; (2) extra care in felling, bucking, yarding; (3) felling snags and diseased trees; (4) disposal of snags and brush; (5) fire-protective requirements." Time studies gave the costs of these operations as $0.855 per thousand which is greater than the cost of private logging. Offsetting this is a cost of $0.78 due to better quality timber and saving in felling and bucking, and in fire protective measures or a net increase in cost of $0.075 per thousand.—*E. N. Munns.*

16. Brewster, D. R. **Relation between height growth of larch seedlings and weather conditions.** Jour. Forestry 16: 861–870.—Data on 112 larch trees in Idaho covering 22 years show the height growth in 1914 to be above the average. Comparisons of growth with the weather records show this growing season to have had more than the average number of clear days, a mean temperature slightly higher than the average and gentle showers well distributed through the growing season. This may be the reason for the greater growth.—*E. N. Munns.*

17. Hutchinson, A. H. **Limiting factors in relation to specific ranges of tolerance of forest trees.** Bot. Gaz. 66: 465–493. *7 fig.* Dec., 1918.—The range of forest trees in Canada is correlated with available information on soil and climate. No quantitative data are given. Temperature, moisture and soil are regarded as the factors most commonly limiting the distribution of trees; but it is shown in a number of specific cases that other factors, such as light, competition, and the time element may be of great importance. Thus, the southern range of *Abies balsamea* is sometimes determined by competition with *Acer* and *Tsuga*. *Larix americana* is often forced by competing species into habitats which they are unable to occupy. This is generally true of species having a wide range. That the northern range of trees is not always determined by temperature is shown by the fact that the lines marking the northern range of a number of species are intersected by isotherms. Some 13 species are discussed in more or less detail.—*G. A. Pearson.*

18. Sampson, Arthur W., and Weyl, Leon H. **Range preservation and its relation to erosion control on western grazing lands.** U. S. Dept. Agric. Bull. 675. *35 p.* 1918.—A study of the relationship between range preservation and erosion was made on the Manti Forest in Utah by comparing the run-off and the erosion from two areas. The two most important factors were found to be the melting of snow and the summer rains. The run-off from melting snow causes severe erosion when the cover is sparse and the slopes steep, and run-off and erosion varies in intensity with the climatic factors, temperature being most important. Most rapid snow melting and most severe erosion occur where there is a lack of vegetation. With rainfall, the extent of erosion and run-off depends on the rate at which rain falls, the steepness of slope, the presence of established gullies, the character of the soil, and the density and character of the vegetation.—Studies of plant growth brought out that erosion is detrimental to plant growth because of lack of adequate soil moisture and lack of plant nutrients due to the reduction of soluble plant foods. On eroded soil, a new series of succession takes place and to reestablish the more desirable and permanent species as occupied the soil before depletion requires years of time and good range management.—The amount of organic matter affects greatly the water-holding capacity and is shown in the little erosion from fully vegetated lands except during intense rainfall or prolonged heavy rain, and then erosion is not serious. Denuded or sparsely vegetated slopes may after small storms have both run-off and erosion.—General observations show moderate sheep grazing on sparsely vegetated range increases the run-off and erosion when the physical factors are favorable to erosion and where erosion is already in the incipient stage. The seriousness of erosion is largely determined by the extent to which ground cover is maintained and this cover may be

destroyed and serious damage result from overgrazing or mismanagement of stock. Deferred and rotation grazing should be practiced and the stock kept under control at all times with slight changes as erosion becomes manifest. With erosion once under way, mechanical methods are necessary to assist nature.—*E. N. Munns.*

19. SAMPSON, ARTHUR W. **Effect of grazing upon aspen reproduction.** U. S. Dept. Agric. Bull. 741. Feb., 1919.—The injury and mortality chargeable to the presence of live stock is roughly proportional to the closeness to which the lands are grazed. Observations covering a five-year period in standing timber on sheep range showed that 27.2 per cent of the reproduction was either injured or killed on lightly grazed plots, 31.8 per cent on moderately grazed areas, and 65 per cent on heavily grazed plots. A large proportion of the nonbrowsed sprouts are killed by causes other than grazing. In standing timber on cattle ranges also the injury varied according to grazing intensity, but was less than on the sheep range. During 1915 and 1916 the average percentage of injured and killed sprouts by cattle browsing was 1.6, 2.4, and 26.8 on lightly, moderately, and heavily grazed plots, respectively.—On clear-cut lands, where the reproduction is conspicuous and the stand even, the annual mortality due to sheep grazing is exceedingly heavy. As a rule three years of successive sheep grazing on such lands results in the destruction of the entire stand. Some injury is also caused by cattle on clear-cut areas, but unless the range is stocked with cattle beyond its normal carrying capacity there is little danger of the reproduction being destroyed beyond the requirements necessary for the establishment of a full commercial stand.—A comparison of the character and intensity of browsing shows that a notably greater proportion of the woody stems is consumed by sheep than by cattle. Even in the autumn after the leaves have dropped sheep devour a considerable quantity of the stems of a single season's growth regardless of the presence of an abundance of choice forage. In the case of cattle, however, the naked stems are practically untouched.—On lands protected from grazing aspen sprouts are produced only during the first two seasons after cutting. On grazed lands a considerable number of sprouts are sent up for three successive seasons following the removal of the timber. The third year's reproduction, however, appears from two to five weeks later than that produced in the two previous seasons and is, for the most part, eliminated shortly after its appearance by adverse climatic factors, chiefly frost.—A surprisingly large proportion of the reproduction produced even on the most favorable sites is killed during the first three years of its growth by causes other than grazing. Frost and bark-eating mammals, notably gophers, field mice, and rabbits, are mainly responsible for such mortality. Much of the damage caused by gophers and mice is done under the snow during winter or early spring.—The annual rate of height increment of the aspen reproduction averages about 15 inches. Hence sprouts 3 years of age are exempt from serious injury by sheep, and those from 4 to 5 years of age are free from serious injury by cattle.—Aspen is practically unable to reproduce under its own shade and the best means of obtaining vigorous and dense reproduction, and at the same time of harvesting the timber economically, is to clear-cut the lands or to thin the stand heavily. [See Bot. Absts. 2, Entry 227.]—*G. A. Pearson.*

GENETICS

GEORGE H. SHULL, *Editor*

20. BAUR, E. [Rev. of: SIEMENS, H. W. **Die biologischen Grundlagen der Rassenhygiene und der Bevölkerungspolitik.** [**The biological foundations of race-hygiene and of eugenical policy.**] *8vo, 80 p., 8 fig.* J. F. Lehmann: München, 1917.] Zeitschr. indukt. Abstamm. Vererb. **19**: 312. Aug., 1918.—See Bot. Absts. 2, Entry 387.

21. BAUR, E. [Rev. of: SIEMENS, H. W. **Biologische Terminologie und rassen-hygienische Propaganda.** [**Biological terminology and eugenical propaganda.**] Arch. Rass. u. Ges. Biol. **1917**: 257. 1917.] Zeitschr. indukt. Abstamm. Vererb. **19**: 311–312. Aug., 1918.—See Bot. Absts. 2, Entry 388.

22. Bergström, Sverker. **Sur les moments de la fonction de correlation normale de n variables. [On the moments of the function of normal correlation of n variables.]** Biometrika 12: 177–188. Nov., 1918.—Demonstrates a simple general formula for calculating the product-moment of any number of variables, distributions of which are in accordance with normal probability curve. The equation follows:

$$M\ [x_1x_2x_3\ .\ .\ .\ x_{2k}] = S\ r_{1,2}\ r_{3,4}\ .\ .\ .\ r_{2k},r_{2k}.$$

Left-hand expression means the product moment of variables x_1, x_2, etc., each measured in terms of its standard deviation. Right-hand expression means sum of products of the correlations in all groups which can be made so as to involve each variable once and only once. As many of the variables, however, may be identical, as may be desired. The following are examples:

$$M\ (xyzw) = r_{xy}r_{zw} + r_{xz}r_{yw} + r_{xw}r_{yz};$$
$$M\ (xyz^2) = r_{xy} + 2r_{xz}r_{yz}.$$

Product-moment of an odd number of variables is zero.—*Sewall Wright.*

23. Detlefsen, J. A., and E. Roberts. **On a back cross in mice involving three allelomorphic pairs of characters.** Genetics 3: 573–598. Nov., 1918.

24. East, E. M., and J. B. Park. **Studies on self-sterility. II. Pollen-tube growth.** Genetics 3: 353–366. *3 fig.* July, 1918.—Author has found that cross and self sterility in certain Nicotianas is due to slow growth of pollen tubes. Pollen tubes of *Nicotiana alata*, *N. angustifolia*, *N. glutinosa*, and *N. Forgetiana* grew well on artificial media, but best on 2 per cent agar plus 20 per cent cane sugar. Maximum length attained was 0.6 mm., usual length being .1–.2 mm. Growth starts slowly, reaching maximum rate in 12–24 hours, and then declines. This is quite unlike growth of tubes in styles, where growth is continuous and rate either remains constant or is regularly accelerated. Numerous attempts failed to indicate that chemical substances in stigmas, styles and ovaries have directive influence on pollen tubes or that there is greater effect of such substances in styles where fertilization is possible, than in styles of "incompatible" plants, but there was unmistakable evidence that presence of gynaecium parts promotes pollen-tube growth. Failure to show directive influence may have been due to too rapid diffusion of chemical stimulants. Attempts to produce self-fertilization in self-sterile plants by pollination of mutilated styles seem to have succeeded in two cases. Pollen germinates as well on "incompatible" stigmas as on "compatible," and 5–10 times as many tubes are produced as are required to fertilize all the ovules.—Microscopical study of styles at definite intervals after pollination showed that, in case of self-pollination and in "incompatible" crosses, pollen-tube growth proceeds at constant rate (average 18 mm. in eight days), while in "compatible" crosses growth starts at approximately the same rate, but rate is accelerated in manner suggestive of autocatalytic reaction. In cases diagrammed fertilization took place in four to five days, total length of styles traversed being 34 to 36 mm. Toward end of flowering season rate of growth of self pollen tubes, or in incompatible crosses, becomes more rapid, but there is little evidence of acceleration during their passage down the style.—Author thinks evidence indicates that there is no inhibition of development of pollen tubes in self-fertilization or in incompatible crosses; but that, in compatible crosses, stimulative substances are secreted by pistil owing to presence of catalyzer produced by pollen-tube nucleus, this catalyzer being produced because in certain specific hereditary factors, plant which produced the pollen differed from plant on which the pollen was placed.—Greater growth of self tubes at end of season is attributed to unrelated phenomenon, namely, parasitism of pollen tube on the now less resistant cells of the pistil. —*Geo. H. Shull.*

25. Embody, G. C. **Artificial hybrids between pike and pickerel.** Jour. Heredity 9: 253–256. *Fig. 4–5.* Oct., 1918.—Occasional finding of wild type fishes in Lake Cayuga, that are intermediate in some respects between northern pike (*Esox lucius*) and pickerel (*Esox reticulatus*) suggested that they might be natural hybrids. Author studied spawning behavior of the two species and found that their spawning seasons overlap and that there was

possibility of chance crossing. He also artificially crossed the two species and was able to rear a few specimens, three of which, at six months after hatching, measured, respectively, 15.2, 13.8 and 9.1 cm. Photographs and descriptions of these specimens indicate that they are intermediate with respect to scalation of cheeks; while in color pattern that of pike is dominant, at least in juvenile stages. It would be interesting to go beyond the F_1 generation, but this has not as yet been accomplished.—*H. H. Newman.*

26. FEDERLEY, HARRY. Zeitschr. indukt. Abstamm. Vererb. 19: 210. June, 1918. [Review of: TANAKA, YOSHIMARO. **Genetic studies on the silkworm.** Jour. College Agric. Sapporo 7: 129–255. *Pl. 1–4.* 1916.]—Reviewer notes that Tanaka in this article summarizes his previous work on silk worms, listing 12 factors, 9 of which influence coloration, markings, and skin-structure, of the caterpillar, 1 the number of moults, and 2 color of cocoons. Only in one case is linkage complete in both sexes, in others it is complete (no crossing over) in female, partial in male. Greater number of independent characters than in Drosophila, is related to fact that *Bombyx* has 28 chromosomes. Reviewer expresses view that reversal of linkage relations with regard to sexes, as compared with *Drosophila,* is due to fact that in *Bombyx* the female is heterozygous while in *Drosophila* male is heterozygous.—*Geo. H. Shull.*

27. HARPER, R. A. **Organization, reproduction and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 57: 375–439. *Pl. 5–6, 35 fig.* 1918.—*Pediastrum* is regarded as exceptionally valuable material for study of various problems, involving origin, heredity, modification and interrelation of characters, because of its simple organization and its inter-specific variability as regards structural characteristics. This study, being one of a series, deals mainly with two species, *P. Boryanum* Kg. and *P. asperum.* Life histories of each are described and compared in great detail with special reference to origin, development and heredity of such characters as spacial interrelation of cells in colony, green color, and shape of cell. Results from statistical studies of certain types of characters are given and discussed. Number of cells in colony tends to be inherited, though fluctuating variability is very marked. Four-lobed cell character is strictly inherited though suggestion is made that the environmental complex may have led in successive generations to development of this four-lobed form and its subsequent hereditary fixation—in other words, the inheritance of an acquired character. Shape and position of the two types of lobe are also strictly inherited, though modified by changes in environmental complex. Cell form determines colony form. Three degrees of directness in hereditary transmission of Pediastrum characters—(1) direct transmission by division of cell character, as green color by chloroplasts; (2) somewhat indirect transmission of adult cell characters, not visible as such in germ cell (lobed cell form); (3) entirely indirect transmission of colony characters (arrangement of cells). Characters of cells are of two distinct categories, metidentical (green plastid color), and characters dependent on organism as a whole (cell form). Neither type necessitates assumption of hereditary factors in a specialized germ plasm to account for their transmission. Form of colony is typical in proportion to vigor of swarm spores at time of colony organization. [See Bot. Absts. 2, Entry 60.]—*O. E. White.*

28. HARRIS, J. ARTHUR. **Further illustrations of the applicability of a coefficient measuring the correlation between a variable and the deviation of a dependent variable from its probable value.** Genetics 3: 328–352. *6 diagrams.* July, 1918.—Usefulness of method proposed by author some years ago is here illustrated by application to ten cases taken from literature, as follows: (1) Proportionality of parts in *Paramecium* (Jennings). Confirms conclusions of Jennings and adds that when *Paramecium* varies in length, both anterior and posterior fractions of body contribute to this variation, but as total length increases, anterior portion becomes relatively shorter. (2) Absence of relationship between size of litter and sex in swine (Parker and Bullard). Confirms conclusions drawn from percentage tables by authors cited. (3) Proportion of pistillate and hermaphrodite flowers in the inflorescence of the composite *Homogyne* (Ludwig). In larger heads purely pistillate flowers are relatively less numerous and hermaphrodite flowers relatively more numerous. (4) Fertility of capsules

and viability of seed in carnation crosses (Stuart). Results are inconclusive because of small amount of data, but there is some indication that there is relatively higher failure to germinate among seeds produced many in a capsule. (5) Relationship between total number of pedicels and number of abnormal pedicels in *Spiraea Vanhouttei* (Harris). Larger inflorescences have relatively smaller proportion of abnormal pedicels; relative number of abnormal pedicels decreases as total number of abnormal pedicels increases; results are consistent but degree of correlation is slight. (6) Interrelation of cotyledons and primordial leaves in a race of *Phaseolus vulgaris* highly variable in seedling characters (Harris). When total number of leaf homologs increases, the increase is due to far greater extent to increase in number of primordial leaves than to increase in number of cotyledons. (7) Changes in proportion of parts in developing trout (Jenkinson). Correlation between head length and total length is approximately same at all stages ($r = 0.72$ to 0.94), but correlation between total length and deviation of head length from its probable value, changes from $r = +0.65$ in first stage through $r = 0.00 \pm$ in third stage, to $r = -0.53$ in fifth stage. (8) Relation between total solids and sucrose content in juice of sugar beets. Juice with higher total solids contains both absolutely more and relatively more sugar than does juice with low total solids. (9) Relation between total number of spikelets and number of sterile spikelets in wheat (Granthan and Groff). Sterility is not merely absolutely but relatively more frequent in varieties with larger numbers of spikelets. (10) Viability of dominants and recessives in F_2 generation of Mendelian hybrids (Yule). No evidence of differential viability is found in Darbishire's mouse data.—Supplementary formulae are given for computation of correlation between a variable and the deviation of a dependent variable from its probable value.—*Geo. H. Shull.*

29. HERTWIG, GÜNTHER. **Kreuzungsversuche an Amphibien. [Hybridization studies on amphibians.]** Arch. mikrosk. Anat. 91: 203–271. *2 fig.* Aug. 20, 1918.

30. HILL, ARTHUR W. **The history of Primula malacoides Franchet, under cultivation.** Jour. Genetics 7: 193–198. *1 fig., 2 pl.* May, 1918.—Discovered in Yunnan, China 1884 by Père Delavay; described by Franchet, 1886; introduced into cultivation through G. Forrest, 1905, 1906; figured in Gardener's Magazine, December 5, 1908; Revue Horticole, 1912, page 156 (colored). Original plants described in detail with an account of the variations produced under cultivation. These include—increase in size of flowers, several white-flowered sports, one mauve-flowered sport, numerous double-flowered sports showing various gradations in doubling, fimbriation of the corolla and calyx segments and scented and scentless foliage. All hybridization attempts have been failures. Much variation occurs in leaf form.—*O. E. White.*

31. HODGSON, ROBERT W. **An interesting bud-sport in the Washington navel orange.** Jour. Heredity 9: 301–303. *Fig. 2.* Nov., 1918.—This sport shows marked increase in vigor over rest of tree which carries it, as evidenced by sudden increase in diameter of branch at point where sport originates, large vigorous leaves, and abnormal amount of fine twiggy growth. It has also acted as sucker and starved the growth on parent limb behind it. Convincing photograph accompanies the article.—*Merle C. Coulter.*

32. HOLDEN, H. S., AND DOROTHY BEXON. **Observations on the anatomy of teratological seedlings. 1. On the anatomy of some polycotylous seedlings of Cheiranthus Cheiri.** Ann. Bot. 32: 513–530. *17 fig.* Oct., 1918.—Study of vascular anatomy of wall flower seedlings which show stages of polycotyly ranging from hemitricotyly to tetracotyly. Concludes that there are two and perhaps three modes of increase involved: (1) cotyledonary fission, a qualitative division of parent cotyledons; (2) dichotomy of growing point of cotyledon, a true quantitative increase; (3) downward displacement of foliage leaves. Conclusions and results of previous investigators discussed to show that polycotyly in other species exhibits same types of increase. [See Bot. Absts. 1, Entry 1330.]—*A. B. Stout.*

33. JACKSON, S. **"Rogues" among potatoes.** Gard Chron. 64: 210. Nov. 23, 1918.—Takes exception to Sutton's statement that only variations appearing in potatoes are color changes and mentions cases to support his contention.—*Richard Wellington.*

34. JONES, D. F. **The effects of inbreeding and cross-breeding upon development.** Connecticut Agric. Exp. Sta. Bull. 207. *100 p. 12 pl.* 1918.—Review of investigations bearing on this problem together with further data collected for plants. Twelve plates illustrating results with maize are included.—Curves show per cent of heterozygous individuals for 1, 5, 10, and 15 allelomorphs in each selfed generation after a cross. Almost complete homozygosity reached by tenth generation, although theoretically, when a single selfed individual is used for each generation, homozygous condition may never be reached. Results for yield, height of plant, and statistical constants are given for eleven generations of selfed maize strains. Conclusions reached that selfing produces (1) lines which cannot be propagated, (2) lines propagated with difficulty, (3) perfectly normal lines but differing in the amount of growth attained. Comparison made from seed of successive generations of lines selfed for 6 to 9 generations showed only small differences. Six crosses between such selfed lines averaged only slightly greater for height of plant, yield, and ear length than selfed lines. Many of these strains are, therefore, nearly homozygous although some appear more so than others.—Crosses, between selfed lines, compared with parents for the number of characters such as yield and height show heterosis (stimulus accompanying heterozygosis) for many plant characters. Heterosis is also shown to have effect on endosperm development, rapidity of growth, hardiness, viability of seed, susceptibility to smut, *Ustilago zeae*, and "damping off" in radishes.—Effects of inbreeding and crossbreeding have been placed on a Mendelian basis, heterosis being explained by dominance of linked growth factors. Linkage prevents homozygous type from containing as many growth factors as can be obtained in cross. Author says this hypothesis seems logical outgrowth of former view, due to increasing knowledge of methods of inheritance.—*H. K. Hayes.*

35. KEMPTON, J. H. **The ancestry of maize.** Jour. Washington Acad. Sci. 9: 3–11. Jan. 4, 1919.—Critical review of recent article on "Evolution in maize" by WEATHERWAX [Bot. Absts. 2, Entry 76] who attempts to defend theory that genus *Zea* along with *Euchlaena* and *Tripsacum* have descended from common ancestral form now extinct. Present author maintains this theory is not established by arguments presented, which are based mainly upon organological comparisons.—*L. H. Smith.*

36. LENZ, FRITZ. **Alternative Modifikationen bei Schmetterlingen. [Alternative modifications in butterflies.]** Zeitschr. indukt. Abstamm. Vererb. 19: 304–309. Aug., 1918.

37. MIDDLETON, AUSTIN RALPH. **Heritable effects of temperature differences on the fission rate of Stylonychia pustulata.** Genetics 3: 534–572. *5 fig.* Nov., 1918.

38. MILN, T. E. **Fasciation not inherent.** Gard. Chron. 64: 210. *Fig. 83.* Nov. 23, 1918.—Speculation regarding inheritance of peculiar fasciation in vegetable marrow, appearing in previous issue of Gard. Chron., provokes present brief comment on hereditary behavior of fasciations in wheat. Among several cases he has observed author has never found "double" heads in wheat to be inherited.—*L. H. Smith.*

39. NAFZIGER, T. E. **How sorghum crosses are made.** Jour. Heredity 9: 321–322. Nov., 1918.—Detailed instructions with respect to technique of making sorghum crosses are given. Attention is called to the difficulty of crossing the milos.—*C. E. Myers.*

40. PHILIPS, A. G. **Satisfactory method of pedigreeing fowls.** Rel. Poultry Jour. 24: 1107–1108, 1174–1176. *5 fig.* 1918.—Compilation of various methods of pedigreeing poultry which have been found satisfactory at Purdue University. [See also Exp. Sta. Rec. 38: 577. June 14, 1918.]—*H. D. Goodale.*

41. Raunkiaer, C. **Über den Begriff der Elementarart im Lichte der modernen Erblichkeitsforschung.** [**On the concept of elementary species in the light of modern genetical investigations.** Zeitschr. indukt. Abstamm. Vererb. **19**: 225–240. *2 fig.* 1918.—Linnaeus's *formal definition* of species and his *practical delimitation* of species were not in agreement; his formal definition made species a group hereditarily distinct, constant in successive generations, and resembling parents; his practical delimitations of species which have determined the ordinary notions of species, were wider than his definition warranted; he lightly disregarded variations.—Self-fertilizing homozygous organisms agree with Linnaeus's formal definition, and in previous publication Raunkiaer proposed term "geno-species" for such homozygous biotypes. Geno-species have become group units in genetics. Smallest unit in taxonomy is "elementary species." While geneticist determines geno-species by progeny of individuals in question, taxonomist determines elementary species by direct examination of individuals themselves. Author points out that paleontological material would remain unclassified if taxonomy required genetic criteria. He defines taxonomic unit (elementary species) as totality of individuals similar at same developmental stage under same circumstances; he names this group also an "isoreagent," since it is totality of all isoreacting individuals. To illustrate he shows that in F_2 from pair of parents with single factor difference (with dominance) geneticists would make two geno-specific groups and one hybrid group, while taxonomist would see only two isoreagent groups.—*J. P. Kelly.*

42. Raunkiaer, C. **Om Løvsspringstiden hos Afkommet af Bøge med forskellig Løvspringstid.** [Danish, with English abstract]. [**On leaftime in the descendants of beeches with different leaf times.**] Bot. Tidsskr. **36**: 197–203. 1918.—Observing beeches under conditions that would eliminate as far as possible influence of age and soil, author saw that certain trees early in leaf remained earliest through three seasons. Fruits of one very late, two late, one early, and one very early, were planted to see if time of leafing is hereditary. Author found close correspondence between mother and offspring, and concludes that within species *Fagus sylvatica* there are subspecies or "isoreagents" differing in regard to time of leafing.—*J. P. Kelly.*

43. Riebesell, P. **Einige zahlenkritische Bemerkungen zu den Mendelschen Regeln.** [**Some remarks critical of ratios in Mendelian inheritance.**] Biol. Zentralbl. **38**: 329–340. Aug., 1918.

44. Russell, E. S. **Derniérs progrés réalisés dans l'étude de la variations, de l'hérédité et de l'évolution.** [Rev. of: Lock, R. H. **Recent progress in the study of variation, heredity and evolution.** *4th ed., 8vo, xii + 336 p., 6 portraits, 47 diagrams.* John Murray: London, 1916.] Scientia **12**: 68–69. Jan. 1, 1918.—This fourth edition has been revised by Dr. L. Doncaster, and contains portrait of author and brief biography by his widow. Reviewer points out that author makes common mistake of assuming that conscious effort of organism plays principal rôle in Lamarckian evolution. Lamarck carefully avoided making such statement, the perception and effort put forth by the organism being for most part unconscious or subconscious.—*Geo. H. Shull.*

45. Schiemann, E. [Rev. of: Haenicke, A. **Vererbungsphysiologische Untersuchungen an Arten von Penicillium und Aspergillus.** [**Genetical investigations on species of Penicillium and Aspergillus**]. Zeitschr. Bot. **8**: 225–343. *1 pl., 11 fig.* 1916.] Zeitschr. indukt. Abstamm. Vererb. **19**: 310–311. Aug., 1918.

46. Shamel, A. D. **Lemon orchard from buds of single selected tree.** Jour. Heredity **9**: 319–320. *Fig. 11.* Nov., 1918.—40-acre orchard with 1700 trees and no off-type trees.—*Merle C. Coulter.*

47. Shamel, A. D., and C. S. Pomeroy. **A fruiting orange thorn.** Jour. Heredity **9**: 315–318. *Fig. 8–10.* Nov., 1918.—Illustrates abnormally large thorns on rapidly growing branches of Washington navel orange, some of which have developed into branches bearing

fruit, leaves, and secondary thorns. Discusses undesirability of thorns in citrus growing. —*Merle C. Coulter.*

48. SIEMENS, HERMANN W. [Rev. of: SEMON, RICHARD. **Die Fusssohle des Menschen. Eine Studie über die unmittelbare und die erbliche Wirkung der Funktion. [The footsole of man. A study of the direct and the hereditary effect of function.]** Arch. mikrosk. Anat. 82: 164–211. 1913. Zeitschr. indukt. Abstamm. Vererb. 19: 209–210. June, 1918.—Semon cited instance of excessively club-footed girl who developed callosities on dorsal surface of foot, closely resembling those normally developed on foot-sole. As peculiarities of sole are foreshadowed in fetal stages he concluded that here is instance of inheritance of an acquired character. Reviewer admits that this is, as in so many cases, an enticing hypothesis, but points out that Semon's chief argument, namely, that condition of foot-sole in fetus has no selective value, is not convincing because selective value of a character may depend upon some other character with which it is strongly correlated.—*Geo. H. Shull.*

49. SMITH, KIRSTINE. **On the standard deviations of adjusted and interpolated values of an observed polynomial function and its constants and the guidance they give towards a proper choice of the distribution of observations.** Biometrika 12: 1–85. *9 diagrams.* Nov., 1918.—Problem investigated in this paper is manner in which a limited number of observations should be distributed relative to one variable in order to yield greatest amount of knowledge about another variable, known to be a function of the first. A function of nth degree can best be determined by bunching the observations in $n + 1$ groups distributed in a certain way. Distribution depends on whether errors of observation are believed to be uniform for all values of the first variable, or to vary. Cases of continuous increase of errors in one direction, and increase or decrease in both directions, are investigated. There is also analysis of effects of continuous distribution of observations. Continuous distribution of observations, supplemented by taking a certain percentage of them in bunches at ends of the range, is found to have advantages.—*Sewall Wright.*

50. STARK, P. **Die Blütenvariationen der Einbeere. [Floral variations of Paris quadrifolia.]** Zeitschr. indukt. Abstamm. Vererb. 19: 241–303. *35 fig.* Aug., 1918.

51. SUTTON, ARTHUR W. **Bud variation in potatoes.** Gard. Chron. 64: 190, 199–200. *Fig. 79.* Nov. 9, 16, 1918.—Maintains that all authenticated bud sports are color changes in skin of tubers. Variations in several varieties are noted, both losses and additions of such skin colors having occurred. Criticism is made of usual methods employed in determining bud variations. [See also following Entry, 52.]—*Richard Wellington.*

52. TAYLOR, GEO. M. **Bud variation in potatoes.** Gard. Chron. 64: 229. Dec. 7, 1918.—Objects to statements made by Sutton in regard to bud variations calls attention to differences between mutants and "rogues," and states that during this season he has two instances of totally different types to parent on stolon otherwise throwing tubers true to type. [See also preceding Entry, 51.]—*Richard Wellington.*

HORTICULTURE

W. H. CHANDLER, *Editor*

53. CONDIT, I. J. **History of the fig in California.** Fig and Olive Jour. 2 (No. 12, May). *Ibid.* 3 (No. 1, June). 1918.—The Mission fig, Mission olive and Mission grape were introduced by the Mission Fathers more than a century ago. Later introductions, included in Dr. Gustave Eisen's bulletin, are mentioned. In 1894 Mr. John Rock, of Niles, received from the U. S. Department of Agriculture scions of 66 varieties, known as the Chiswick collection furnished to the Department by the Royal Horticultural Society of London. These scions were inserted in old trees on the nursery grounds, and were in good condition in 1914. Since then those not killed by gophers were grubbed out. Fortunately the greater part of the col-

lection had been duplicated at the U. S. Plant Introduction Garden at Chico.—One of the most interesting and varied collections has been assembled by Mr. J. Leroy Nickel at his place at Menlo Park. At one time this collection included the varieties collected by John Rock, Felix Gillet and the Department of Agriculture, besides many importations from France and other parts of Europe, and totaled 125 varieties.—In the spring of 1886, E. W. Maslin planted a seedling fig orchard at Loomis, Placer County, the trees having been raised from seeds of imported Smyrna figs. This orchard developed many interesting and valuable capri figs, as well as promising varieties of the Smyrna type. In 1908 the orchard was leased by the U. S. Department of Agriculture, and since then cuttings from the best trees have been distributed free to growers, by application to G. P. Rixford of San Francisco.—The author in conclusion presents the main facts he has gathered regarding the so-called Kadota fig. Somewhere between 1889 and 1891 the firm of Twogood & Cutter, nurserymen of Riverside, received from H. E. Van Deman of the Department of Agriculture, seven varieties of figs. Among them was one called Dottato which seemed worthy of propagation. All the rest were destroyed. Mr. Cutter showed specimens of the fruit and invited people to sample it at the Fruit Growers Convention, at Los Angeles, about 1892. About 1895 it was found in the hands of Mr. Taft, of Sawtelle, who gave it the name Kadota, although the tag on the original tree read Dottato. Mr. Cutter believed, as stated in the Riverside Press and Horticulturist, that he had found a fig which would be of considerable value for table use and possibly for shipping because of its good quality and freedom from splitting, and he placed the Dottato at the head of all the varieties with which he was acquainted. Mr. James Mills, now of Hamilton City, formerly of Riverside, also pronounces it the finest fig he ever tasted.—The annual report of the Pomologist, contained in the report of the Secretary of Agriculture for 1890, reports the distribution of the Dottato and others. The writer has already published facts regarding the history of this fig and the origin of the misnomer "Kadota." Since it is a misnomer, he believes the use of the name should be discontinued and that Dottato, the correct name, be substituted.—*G. P. Rixford.*

54. JENSEN, C. A. **Humus in mulched basins, relation of humus content to orange production, and effect of mulches on orange production.** Jour. Agric. Res. 12: 505–518. Feb. 25, 1918.—Humus determinations were made at intervals in soil from basins around orange trees that had been mulched with manure and alfalfa. The results showed similar increases of humus from the two materials, but the yield of fruit was not correlated with the increases in humus. Alfalfa produced considerably greater yields than manure. Much larger yields of fruit were produced by the use of manure as a mulch than when applied broadcast and plowed down. The yields of fruit as affected by a number of other organic materials were also noted. Jensen concludes that the effects produced are not due to the humus formed, but to plant food made soluble by the action of the organic materials on the soil constituents.—*W. G. Kelly.*

55. MACKIE, D. B. **Notes on a navel variety of the Satsuma orange.** California Citrograph 4: 20. Nov., 1918.—Satsuma oranges with a navel mark were observed in Japan by the writer in 1908 and later in 1915. Recently a paper on the subject, entitled, "The appearance of the navel mark on the Satsuma orange," has been published by A. Kikuchi, Director of the Yamagawa Experiment Station. A summary of the paper is given.—*I. J. Condit.*

56. STEWART, JOHN P. **The fertilization of apple orchards.** Pennsylvania State Coll. Bull 153: 1–31. *1 fig.* May, 1918.—The present discussion is based on six experiments in bearing orchards, and covers a production of 36,192 bushels of fruit during the last ten years. Two of these orchards received no cultivation, one was untilled except for two seasons, one was tilled during most of the experiment, and the remaining two were given annual cultivation. In the two most responsive orchards—in both cases orchards receiving no cultivation—nitrogen has been most influential in improving both yield and growth. It has also shown important benefits in these respects in five of the six experiments. Where nitrogen has proved beneficial, its influence has shown no signs of reduction at the close of the ten-year period.

The addition of phosphorus or potash to nitrogen applications has usually given larger returns than nitrogen alone. However, in three of the orchards, the addition of phosphorus has resulted in no important benefit. Neither phosphorus nor lime, when used alone, has shown any important influence on yield or growth in apples. Potash has increased the yields materially in three of the experiments and apparently shown some value in increasing the average size of the fruit. It has also apparently had an injurious effect in two experiments. In a comparison of carriers, no important difference has appeared in ten years between the various forms of potash. The same is true in part of phosphorus, although at present the evidence favors the acid phosphate, at least in the absence of tillage. The distinctly retarding influence of nitrogenous fertilizers and manure on color is due to delayed maturity. In these experiments, fertilization has usually had very little influence on the average size of the fruit. This is apparently because it acted primarily in increasing the total amount of fruit and foliage on the tree, both of which influences tended to decrease the average size of the fruit. Manure, however, usually secured a fair increase in size, probably chiefly because of its moisture-conserving effect. In one orchard—that tilled during most of the experiment—no type of fertilization has yet given a profitable return. In general, the author has been unable to find any definite correlation between soil composition, as ascertainable by the ordinary chemical means, and the actual response of the associated trees to additional fertilization.—*R. D. Anthony.*

57. WICKS, W. H. **The effect of cross-pollination on size, color, shape, and quality of the apple.** Univ. Arkansas Agric. Exp. Sta. Bull. 143: 1-32. *Pl. I-IX* (*V-IX colored*). Mar., 1918.—Technical. Three year's data are given on the effect on the size, color, shape, and quality of reciprocal crosses between Jonathan, Ben Davis, Winesap, and Grimes Golden apples. A total of 11,290 hand pollinations, producing 773 apples, were made. No effect on the characters studied could be seen due to any of the crosses. Some varieties showed under developed and unevenly developed apples due to imperfect pollination. Where pollination was complete no influence of the male parent could be noted. Greatest affinity was exhibited between: Ben Davis (female) × Grimes, Grimes (female) × Jonathan, Grimes (female) × Ben Davis, Ben Davis (female) × Jonathan. The facts obtained are said to justify the planting of varieties primarily for the benefits of cross-pollination.—*John A. Elliott.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

58. DRECHSLER, CHARLES. **Morphology of the genus Actinomyces.** Bot. Gaz. 67: 65-83, 147-168. *Pl. 2-9, 112 fig.* 1919.—Author reviews previous work on this genus and describes the technique which he has developed. The vegetative thallus of *Actinomyces* consists of a my cellium of profusely branching hyphae which attain a much greater extent than the branching figures recorded for bacteria of the acid-fast group. The hyphae are not uniform in diameter. The aerial mycelium usually occurs in the form of a mat with the fructifications distinct, but in some species the fructifications are combined to form erect sporodochia. The individual fructification consists of a sterile axial filament bearing branches loosely or in dense heads. The primary branches may be sporogenous or may produce secondary sporogenous branches. Fructifications tend to be either erect and dendroidal or prostrate and racemose. The sporogenous hyphae are usually coiled spirally. Sporogenesis begins at the tips of the fertile branches and proceeds basipetally. The character of the spirals and of the septa provide specific distinctions. Granules, nuclear in appearance, occur in many spores. The author describes and discusses the occurrence of metachromatic granules in the sterile hyphae; of distensions, and of certain spherical structures. He rejects the theory that *Actinomyces* is transitional between the Hyphomycetes and the Schizomycetes, since it shows no well defined bacterial characteristics (aside from its minute size, which he regards as unim-

portant); and casts doubt on the value of the "acid-fast" staining reaction in mycological research. He believes that the genus should be placed unqualifiedly among the Hyphomycetes. Seventeen morphologically distinct types are described. [See Bot. Absts. 2, Entry 995.]—*E. W. Sinnott.*

59. Georgevitch, P. **Génération asexuée du Padina pavonia Lamour.** [The asexual generation of Padina pavonia Lamour.] Compt. Rend. Acad. Sci. Paris 167: 536–537. 1918.—The primary cell giving rise to the tetrasporangium is called the rudiment of a tetrasporangium. It divides into a smaller basal cell, and a larger dome-shaped superior cell, which is the tetraspore mother cell. The nucleus of the latter passes into synapsis and a little later chromosomes become organized. During these processes the nucleolus remains visible but the centrosomes cannot be detected until the last-named stage is reached. At this time also a central intranuclear spindle makes its appearance. It consists of 5 or 6 double fibers extending from pole to pole. At the metaphase which follows 24 chromosomes may be counted, 12 later going to each end of the spindle, respectively. Quadripartition of the cell succeeds the second nuclear division.—*C. H. Farr.*

60. Harper, R. A. **Organization, reproduction and inheritance in Pediastrum.** Proc. Amer. Phil. Soc. 57: 375–439. *2 pl., 35 fig.* 1918.—A continuation of the author's studies on problems of organization in colonial algae. A detailed account is presented of development and inheritance in various species of *Pediastrum.* Cell form is due in part to heredity and in part to environmental pressure and contact relations between cells. The inheritance of cell form is not direct, as is the inheritance of green color, but is indirect; since the germ cell is simple and undifferentiated and develops the typical form of the adult cell only as a result of ontogenetic development. Cell form seems to be the direct expression of the organization of the cell as a whole rather than dependent on chromosomal determiners. Neither does the author believe that the characters of the colony as a whole are due to factorial dispositions in the germ cell but regards them instead as dependent directly on the interactions of the "form, polarities, adhesiveness, surface tension, etc., of the individual cells." Evidence is brought forward that each cell has a biaxial polarity and a specific orientation in the colony. Author discusses the relation of heredity and of environment to morphogenesis in this genus. [See Bot. Absts. 2, Entry 27.]—*E. W. Sinnott.*

61. Harper, R. A. **The evolution of cell types and contact and pressure responses in Pediastrum.** Mem. Torrey Bot. Club 17: 210–240. *27 fig.* 1918.—An evolutinary study of the various subgenera of *Pediastrum* with especial reference to the problems of morphogenesis involved. The manner in which the more complex types have arisen from the simpler ones is suggested and the existence of orthogenetic tendencies in most of the subgenera is noted. The relations between the characters of the cell and the characters of the colony are studied. In order to form a rounded least-surface contour for the colony, the individual cells must lose in part their own tendency to assume the least-surface form owing to contacts with other cells; and this irregular cell form has apparently become fixed by heredity so that it now appears even when the cell grows quite freely. The type pattern of the colony is based on the polarity of the swarm spores and their sensitiveness to contact and pressure stimuli, and not to any factors of mozaic inheritance spatially differentiated in the organization of the mother cell. This polarity of the cells and their capacity to respond to contact and pressure stimuli have probably increased during the evolution of the genus. The gradual construction of a symmetrical colony from a mass of free-swimming swarm spores the author believes not to be due primarily to the physical principles of surface tension, adhesion, mutual pressure, etc., alone, nor to a "mysterious controlling and adaptive principle of behaviour;" but rather to interactions between polarized cells highly sensitive to contact and pressure stimuli.—*E. W. Sinnott.*

62. Harper, R. A. **Binary fission and surface tension in the development of the colony in Volvox.** Mem. Brooklyn Bot. Garden 1: 154–166. *1 pl., 4 fig.* 1918.—*Volvox* has advanced

beyond such forms as *Gonium* in the direction of a typical metaphytic habit in (1) the tenacity with which the cells of the colony adhere to one another, (2) the growth of the germ cells and daughter cells to relatively large size between successive divisions and (3) the possession of differentiated germ and somatic cells. The author discusses the morphogenesis of the *Volvox* colony on the basis of interactions between surface tension, adhesion and binary fission. "The facts as known are certainly quite in harmony with the view that such presumably easily influenced factors as adhesion and surface tension, combined with the more fundamental and ever-present incompatibility between the principles of binary fission and least surfaces, may be of determining significance in the transition from the plate-shaped to the three-dimensional globular form of colony with all its evolutionary significance."—*E. W. Sinnott.*

63. MOREAU, FERNAND M., AND MME. FERNAND. **Étude cytologique du developpement de l'apothécie des Peltigéracées. [A cytológical study of the development of the apotheciuns in the Peltiger aceae.]** Compt. Rend. Acad. Sci. Paris **166**: 178–179. 1918.—According to authors, asci of Peltigeraceae are formed from ascogonia which in *Solorina* arise in the algal layer and in *Peltigera* and *Peltidea* in the medullary layer. The ascogonia are formed from long, isodiametric cells which are at first uninucleate and later multinucleate. Much later the ascogonia give rise to multinucleate ascogenous hyphae, the cells of which very soon become binucleate. The ascogenous hyphae branch and rebranch and the terminal cells form the asci. The two nuclei of terminal ascogenous cell fuse. Resulting nucleus undergoes three divisions. In *Peltigera, Peltidea,* and *Nephromium* each nucleus becomes the nucleus of a spore and later divides two or more times to form the nuclei of the pluriseptate spore. In *Solorina saccata* eight nuclei are formed as with the others mentioned but only four participate in spore formation, the other four nuclei disintegrating in the epiplasm. The resulting four spores become bicellular at maturity. Neither fecundation by spermatia and trichogynes nor a fusion of nuclei preceding that of the ascus were observed.—*F. A. McAllister.*

64. SEAVER, F. J., AND W. T. HORNE. **Life-history studies in Sclerotinia.** Mem. Torrey Bot. Club **17**: 202–207. *Pl. 1.* 1918.—A *Sclerotinia* found on rootstocks of *Geranium maculatum* led to a fruitless search for the imperfect stage on living portions of the plant; a *Botrytis* was however isolated from diseased rootstocks when placed in a moist chamber. Cultural studies were then carried out in an effort to connect the *Botrytis* with the perfect stage. Vigorous growths were easily obtained on sterile potato plugs. Cultures made from single ascospores soon gave rise to a *Botrytis*, and comparisons showed the two to be identical. Inoculations were now made using sterile rootstocks and in a few days similar *Botrytis* spores were obtained from each inoculation. Rootstocks are retained in hopes of later securing the perfect stage. Results indicate connection of the *Botrytis* with the *Sclerotinia*, and as the fungus does not fit any found description, it is listed by the authors as a new species, *Sclerotinia* (*Stromatinia*) *Geranii* Seaver and Horne. [See Bot. Absts. 1, Entry 785.]—*E. M. Gilbert.*

BRYOPHYTES

65. EVANS, A. W. **The air-chambers of Grimaldia fragrans.** Bull. Torrey Bot. Club **45**: 235–251. *14 fig.* 1918.—There are several tiers of air chambers in the thicker portions of the thallus of *Grimaldia*, and the author states that these are all connected by openings of various sizes. The outer chambers as usual open externally by regular pores. The upper chambers are more or less divided by irregular partitions which are poorly developed in the lower chambers, or may be quite absent. Except for short, tooth-like outgrowths of the partition walls of the dorsal chambers, there is nothing corresponding to the green filaments found in the air chambers of *Marchantia* and several other genera. The chambers all owe their origin to splitting of the cell walls in originally solid tissues. This splitting may begin below the surface of the thallus, or it may start at the surface and extend inwards. The dorsal chambers form first, the inner ones somewhat later. The secondary increase in size of the chambers is due almost entirely to growth of the bounding cells, and only slightly to

further splittings of the cell walls. "The system of united cell-plates in the dorsal chambers, and the partitions between the chambers, increase in vertical height simultaneously. Direct outgrowths from the surfaces of the cell plates play a very small part in the process of subdivision."—*D. H. Campbell.*

SPERMATOPHYTES

66. Hirase, Sakugoro. **Nouvelles rechérches sur la fecondation et l'embryogenie du Ginkgo biloba. [New studies of fertilization and embryogeny in Ginkgo biloca.]** Bot. Mag. Tôkiô 32: 83–108. *1 pl.* 1918. [Japanese. Summary in French in same vol. p. 139–143.]—Author reviews the various investigations and opinions concerning origin of the drop of liquid found in the so-called archegonial chamber of *Ginkgo* and cycads. He dissected out the female gametophytes just prior to fertilization and placed them in moist chambers. In this way he was able to observe that a number of minute droplets were formed on the endosperm (female gametophyte) just outside the border of the archegonial chamber. In from ten to twenty hours these attained such size that they fused and sufficed to fill the chamber. If chloroform vapors were introduced into the saturated atmosphere the drops formed within three to six minutes. Osmic acid fumes entirely suppressed the secretion. That this secretion was not a mere condensation of water from the saturated atmosphere was shown by employing younger gametophytes, in which case no droplets at all were formed. Just before entrance of pollen tube into archegonial chamber, the upper part of the egg forms a large vacuole which serves the purpose of a "receptive chamber" for the sperm. Some of the liquid from this vacuole oozes out between the neck cells and becomes mixed with the secretion filling the archegonial chamber.—*L. L. Burlingame.*

67. Artschwager, Ernst F. **Anatomy of the potato plant, with special reference to the ontogeny of the vascular system.** Jour. Agric. Res. 14: 221–252. *Pl. 27–47, 4 fig.* 1918.—The vascular topography of the root, stolon, tuber, stem, leaf and flower of *Solanum tuberosnm* is presented in detail; the ontogeny of the vasuclar tissues thoroughly worked out, and the activity of the cambium described. The protoxylem matures before the protophloem, contrary to the usual condition in higher plants. The inner phloem groups of the characteristic bicollateral bundles often occur near center of stem. Their character and position is discussed. The branching and anastomosis of the phloem groups, both inner and outer, is described. A considerable amount of secondary wood is formed, and author calls attention to the large amount and probably important function of the secondary phloem. The observations of Reed on tuber formation are in general confirmed, but author believes that it is the perimedullary zone rather than the pith which forms most of the tuber. Periderm is formed both by hypodermis and epidermis.—*E. W. Sinnott.*

68. Davie, R. C. **On the leaf-trace in some pinnate leaves.** Trans. Roy. Soc. Edinburgh 52^1: 1–36. *1 pl.* 1918.—Paper based on a comparative study of the leaf trace of several Ferns, Cycads, Monocotyledons and Dicotyledons. Conclusion is reached that factors controlling form of leaf-trace and its system of branching are: (a) systematic position, (b) length of leaf and size of its appendages, (c) order of development of the pinnae, and (d) type of vascular system found in the stem.—*J. H. Faull.*

69. Morvillez, F. **La trace foliare des Chrysobalanées. [The foliar trace of the Chrysobalanaceæ.]** Compt. Rend Acad. Sci. 166: 859–861. *1 fig.* 1918.—Eight types of leaf traces from different species of Chrysobalaneae are described and figured. They show degrees of development from very simple to complex. They do not show very close affinity with leaf traces of other Rosaceae but present a curious likeness to those of Caesalpinoideae. Hence, since Chrysobalaneae seem to stand about equally distant from Rosaceae and Leguminosae, author considers that they should form a small independent family.—*Eloise Gerry.*

70. Morvillez, F. **La trace foliaire des Légumineuses-Caesalpiniées. [The foliar trace of the Cæsalpineæ.]** Compt. Rend. Acad. Sci. Paris 167: 205–208. *Fig. 1–9.* 1918.—Nine

types of leaf trace are figured and discussed. The results differ from those of Petit (1887). The different appearance of the leaf trace at different heights is pointed out. These leaf traces are, however, related naturally by many common characteristics. They also show certain structures analagous to structures pointed out by the author in the leaf traces of the Rosaceae and Chrysobalaneae respectively and, in addition, structures showing affinities with those which are found in other sub-families of the Leguminoseae.—*Eloise Gerry.*

71. MORVILLEZ, F. **L'appareil conducteur des feuilles des Saxifragacées. [The conducting system of the leaf in the Saxifragaceæ.]** Compt. Rend. Acad. Sci. Paris 167: 555–558. *Fig. 1–9.* 1918.—The characteristics of the conductive structures of the different Saxifragaceae were found to correspond closely to the tribal divisions established morphologically. Representatives of eight tribes are discussed and the disposition of the bundles illustrated by nine text figures. The author concludes that leaf traces with the numerous different regions best defined are found in the tribes with superior ovaries. In those with the ovary generally inferior the leaf trace tends to be reduced to a simple arc; in the forms of this group with opposite leaves vestiges of the other type of bundle arrangement are found but in the tribes with alternate leaves these vestiges are lacking. In certain genera most marked affinities with the leaf traces of the Rosaceae and also certain similarities to those of the Leguminoseae were noted. A further likeness of the Saxifragaceae to the Rosaceae was the reduction of the leaf trace to an open arc, in certain types with inferior ovaries, which the author has found in both families.—*Eloise Gerry.*

72. SMALL, J. **The origin and development of the Compositae. Chapter IV. The corolla.** New Phytol. 17: 13–40. *Fig. 8–10.* 1918.—Previous literature dealing with the corolla of the Compositae is fully reviewed. Fundamental form of corolla is taken to be tubular, with a campanulate upper region and five equal lobes. This, author thinks, gave rise by a mutation to the five-toothed ligulate form characteristic of the Cichorieae. Another mutation led to the appearance of laticiferous vessels in this tribe. The bilabiate corolla characteristic of the ordinary ray floret of the tribes other than the Cichorieae (the inner lip being, however, aborted as a rule) is derived from the tubular type, and from it in turn, by an elongation of tube and a reduction in lips, came the filiform type which is very narrowly tubular without the terminal expansion into a limb. The differences which characterize the mature corollas arise at an early stage, and are based upon differences in the behavior of the two posterior petals. Attempts to modify experimentally the form of the developing corolla were largely unsuccessful. Flower colors of the various tribes are discussed on the assumption that green, yellow, orange, and white are primitive; red, purple, violet, and blue more advanced. The vascular anatomy of the tubular and ligulate corollas is constant; that of the bilabiate corolla is as variable as the external form of this type. These studies of the form, development, color, and anatomy of the corolla confirm, with a few modifications, the phyletic conclusions previously reached upon other grounds.—*C. E. Allen.*

73. SMALL, J. **The origin and development of the Compositae. Chapter V. The pappus.** New Phytol. 17: 69–94. *Fig. 11–18.* 1918.—From the evidences presented by previous writers, and from his own observations, author concludes in favor of the trichome nature of the Composite pappus, holding that the foliose calyx limb, when it occurs teratologically, is a reversion to a pre-Composite ancestor. The setose-scabrid type of pappus, composed of fused uniseriate rows of cells with the obtuse terminal cell of each row free and projecting for a short distance, is considered primitive. Modifications of this give a series of setose types; by lateral fusions of the setae a series of paleaceous forms is produced, and fusion of the setae in clumps gives the aristate types. Short, ring-shaped types result from reduction of either paleaceous or aristate forms. Cohesion and reduction are ruling factors in the evolution of the pappus, as in that of other parts of the flower. Distribution of the various pappus types in the tribes of the Compositae is discussed at length. The dominance of the most primitive forms in *Senecio* confirms this as the basal genus. In general, this study gives results as to phyletic relationships agreeing with those derived from the study of other floral structures

and also, the author thinks, furnishes valuable indications of the more detailed evolution of certain groups such as the Vernonieae, Eupatorieae, Cynareae, and Mutisieae.—*C. E. Allen.*

74. Small, J. **The origin and development of the Compositae. Chapters VI (The involucre), VII (The receptacle), and VIII (Phyllotaxis of the Compositae).** New Phytol. **17:** 114–142. *Fig. 19–24.* 1918.—The complete involucre of the Compositae usually includes an inner *pericline*, consisting of bracts which have, or have probably had, florets in their axils; and a *calyculus*, developed from cauline leaves. Author concludes that the capitulum arose from a racemose umbel by an abortion of its pedicels; the bracts of the outer flowers formed a uniseriate pericline, and an aggregation of cauline leaves immediately below the inflorescence produced the calyculus, at first composed of a few scattered members. Progressive sterilization of the floral bracts resulted in a pluriseriate pericline, and progressive aggregation and reduction of cauline leaves gave a denser, pluriseriate calyculus. Distribution of involucral types within the family follows in general the same phyletic lines as does that of floral and other characters studied.—The receptacle is of little phyletic value, but furnishes evidence in favor of origin of several tribes already suggested on other grounds. Primitive receptacle is held to be flat or nearly so, having a foveolate structure and with a tendency to reversion to a pre-Composite ancestor evidenced by the occasional appearance of paleae in the positions of bracts. A progressive development of ridges between depressions in the surface of the receptacle resulted in appearance of other types of receptacle such as the setiferous and the alveolate.—Alternate arrangement of leaves seems to be the primitive condition in the Compositae. This is found in the primitive Senecioninae, with occasional reversions to the opposite-leaved condition probably characteristic of a very distant ancestor. The Heliantheae, although advanced in all their floral characters, show a marked atavistic tendency in their phyllotaxis as well as in other respects. A study of the phyllotaxis of the capitulum shows the calyculus more nearly akin to the cauline leaves than to the periclinal bracts and confirms the distinction drawn between pericline and calyculus; proves the number and position of ray florets to be primarily dependent on the bracts of the pericline; and shows that the uniseriate type of ray is primitive for radiate capitula.—*C. E. Allen.*

75. Small, J. **The origin and development of the Compositae. Chapter IX. Fruit dispersal in the Compositae.** New Phytol. **17:** 200–230. *Fig. 25–28.* 1918.—A consideration of published work shows, author thinks, that a number of Compositae are regularly dispersed by wind to distances of 4 to 20 miles, and that pappose fruits are occasionally carried as much as 100 miles. Experiments with a specially devised apparatus in which fruits of various Composites were subjected to air currents of measured pressure showed that air pressures much lower than those assumed by previous writers suffice to carry the fruits for considerable distances. Thus a pressure equivalent to a wind velocity of 2.06 miles per hour carried a fruit of *Taraxacum officinale* immediately through and out of a horizontal tube 125 cms. in length; and at a velocity of 1.01 miles per hour the same fruit was carried laterally to a distance equal to that of the vertical fall. A theoretical consideration of the hydrodynamics of wind dispersal, in connection with these experimental results, leads to the conclusion that, the relative humidity of the air being not above 0.77, a horizontal wind with a velocity of 1.97 miles per hour is sufficient for the dispersal of *Taraxacum* fruits to any distance. If the humidity is greater, the pappus closes and the fruit drops rapidly. The minimum wind velocity for fruit dispersal is estimated for other species as follows: *Senecio vulgaris*, 1.25 miles per hour; *Centaurea imperialis*, 7.3 miles per hour; *Ursinia speciosa*, 2.47 miles per hour; *Leontopodium alpinum*, 4.4 miles per hour. Given a low relative humidity and a wind above the minimum velocity for dispersal of the particular species blowing steadily in the same direction over a large stretch, the author holds that the ordinary pappose fruit can be blown many hundreds of miles over land or sea. It follows that hypothetical land bridges are not necessary to explain the present distribution of the Compositae.—*C. E. Allen.*

76. Weatherwax, P. **The evolution of maize.** Bull. Torrey Bot. Club **45:** 309–342. *36 fig.* 1918.—The tribe Maydeae is divided into two classes, and discussion is confined to the three

American genera, *Zea*, *Euchlaena*, and *Tripsacum*, which bear evidences of close relationship and are classed together. The morphology of the three genera is discussed, and is made the basis for the new theory of the evolution of maize which author proposes, after reviewing theories now in vogue and showing their fallacies. Discussion may be summarized as follows: (1) Vestigial organs being considered, *Zea*, *Euchlaena*, and *Tripsacum* are identical in structural plan. Present aspect of each is due to suppression of parts present in a primitive ancestor having perfect flowers borne in one type of inflorescence. (2) The ear of maize is the homologue of the central spike of the tassel. No morphological evidence supports the view that either of these organs originated in the fusion of more simple parts, and there is in no one of the genera here considered any organ the like of which could have united to form either the ear or the central spike of the tassel. (3) The prevailing theory that maize is a species of hybrid origin has little to suggest it when maize and its near relatives are thoroughly understood, and it is not in harmony with the most significant facts of morphology. It seems much more probable that *Zea*, *Euchlaena*, and *Tripsacum* have descended independently from a common ancestral form now extinct. [See Bot. Absts. 1, Entry 503; 2, Entry 35.]—*V. A. Pease.*

77. BEAUVERD, M. C. **Monographie du genre Melampyrum. [A monograph of the genus Melampyrum.]** Mém. Soc. Phys. et Hist. Nat. Genève. 38[6]: 1918.—An intensive study of the genus Melampyrum, of which 14 species are recognized, widely distributed in the northern hemisphere. There are 4 areas of distribution; a North American; an Eurasiatic; an eastern Mediterranean, and a Far East or Chinese and Japanese area. Author has studied in the field the range of variation of species and forms and by careful microscopic study of details of flower has convinced himself of relative value of fixed qualitative and variable quantitative characters in the discrimination of the species. There is a résumé of previous work, a treatment in detail of the morphology of the vegetative and reproductive organs and another chapter, entitled "Biological notes," which deals with pollination, distribution of seeds by aid of ants, and some ecological notes based upon author's own observations. [Through review in Nature 102: 115–116. 1918.]—*F. Grace Smith.*

78. ALVARADO, S. **Plastosomas y leucoplastos en algunas fanerogamas. [Plastosomes and leucoplasts in certain phanerogams.]** Trab. Museo Nacion. Cienc. Nat. Madrid Ser. Bot. No. 13. 1918. [Note by L. DUFOUR in Rev. Gén. Bot. 30: 333–334. 1918.]—The plastosomes (chondriosomes) were studied chiefly in the root of *Cicer arietinum.* They are small bodies which may be united into filaments but without losing their individuality, and may again be separated. They are transformed into leucoplasts by a chemical modification without change of form. This transformation occurs in plastosomes in any part of a meristematic cell; in differentiated parenchyma cells, only in perinuclear plastosomes. The number of leucoplasts is increased, not by their division, but only by transformation of additional plastosomes. Starch is formed both in plastosomes and in leucoplasts. In either case the body in question is completely changed into starch.—*C. E. Allen.*

79. GRAHAM, MARGARET. **Centrosomes during early fertilization stages in Preissia quadrata.** Mem. Torrey Bot. Club 17: 323–325. 1918.—After the egg and the antherozoid have united and before the two nuclei fuse, the cytoplasm is differentiated into an inner granular zone and a peripheral vacuolar zone. In the former region are to be found two centrosomes, at first very near together; but as the antherozoid nucleus enlarges they separate and take up positions at the two poles, respectively. The rays are few and very long. Material was fixed in a modified Flemming solution.—*C. H. Farr.*

80. GUILLIERMOND, M. A. **Sur l'origine mitochondriale des plastides. [On the mitochondrial origin of plastids.]** Compt. Rend. Acad. Sci. Paris 167: 430–433. 1918.—Issue is taken with the theory recently supported by Mottier which holds that the plastids are not formed from mitochondria, but that they arise only by division and that they exist in germinal and undifferentiated cells as structures much resembling mitochondria. Evidence

against this theory is found in observations of several types of cells. Author believes it has been demonstrated that pigment bodies of animal cells are formed from mitochondria, and hence by analogy that plastids of plants must arise in the same fashion. It is found in young stems of cucurbits that the amyloplasts arise from chondriocontes. These occur in the same cells as the granular mitochondria, and in the tuber of the potato the latter may also produce amyloplasts. The two types of chondriosomes are held to be genetically related, as is shown in the embryo sac mother cell of the Liliaceae. Author regards interpretation of Mottier to be based on lack of recognition of occurrence of two kinds of mitochondria.—*C. H. Farr.*

81. MOTTIER, D. M. **Chondriosomes and the primorida of chloroplasts and leucoplasts.** Ann. Bot. 32: 91–114. *1 pl.* 1918.—Two kinds of structures frequently occur in the cytoplasm of plant cells which have by some investigators been included under the term chondriosomes. These are chondriosomes proper, and the primordia of plastids. Both divide by constriction and in some cases are so similar as to be indistinguishable, although the latter are frequently thicker rods. These enlarge and become chloroplasts or leucoplasts, while the true chondriosomes remain unchanged. These stages of development are traced in successive cells beginning at the meristem in root tips and at the apical cell of the thallus in *Marchantia.* In this genus very large chondriosomes and an absence of chloroplasts are to be noted in the mucilage-producing hairs on the ventral scales, in the young rhizoids and in spermogenous tissue. The primordia of plastids are not demonstrated in these cells, but it is believed that they are present in all germinal tissue at least. A study of *Anthoceros,* with only one chloroplast, demonstrates that the chondriosomes are not disorganized chloroplasts and that they resemble somewhat the pyrenoids. In *Adiantum,* products of the plastids stain differently from the chondriosomes. *Elodea* was studied for comparison with other workers. It is concluded that the chondriosomes and primordia of plastids as well as the nucleus are transmitted in sexual reproduction and are bearers of hereditary characters.—*C. H. Farr.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

82. ANTEVS, E. **Some corrigenda.** Geol. Fören. Förhandl. 40: 892–893. Nov., 1918.—Contains corrections of statements made in the author's paper on the post-glacial marine history of Bohuslän and reports the following fossil plants from the submerged peat bog at Kongedybet in Denmark: *Corylus avellana, Cornus sanguinea, Crataegus, Betula, Mnium, Viburnum opulus, Alnus glutinosa, Populus tremula, Rhamnus frangula, Ranunculus repens, Spiraea ulmaria and Phragmites communis.—Edward W. Berry.*

83. BERRY, EDWARD W. **Eucalyptus never present in North America.** Science 49: 91–92. 1919.—Comments on the origin and distribution of the Myrtaceae and concludes that the fossil forms from North America identified as *Eucalyptus* represent the ancestral stock of *Myrcia* and *Eugenia.* Suggests that the non-committal name *Myrtophyllum* be used for Eucalyptus-like leaves of uncertain generic relationship within the family Myrtaceae.—*Edward W. Berry.*

84. BERRY, EDWARD W. **The fossil higher plants from the Canal Zone.** U. S. National Mus. Bull. 103: 15–44. *Pl. 12–18.* Jan., 1919.—An account of the fossil vascular plants discovered during the geological studies of the Canal Zone. The deposits containing plants are for the most part tuffs and the materials are usually poorly preserved. They include fragments of a fern thought to represent *Acrostichum,* two undetermined palms represented by leaves and a third represented by wood, and 16 species of dicotyledons represented by leaves and fruits. The petrified palm, *Palmoxylon palmacites* and an abundant petrified leguminous tree, *Taenioxylon multiradiatum,* are common to the Oligocene of the Island of Antigua.

With these two exceptions together with the euphorbiaceous species *Hieronymia Lehmanni* common to the Tertiary of Ecuador, and *Guatteria culebrensis* n. sp. which has subsequently been found in the lower Miocene of northern Peru, the species are not known outside of the Panama region and are new to science. The petrified fruits of a new species of ebony, *Diospyros Macdonaldi* are thought to be of Eocene age. The balance of the material is of Oligocene and lower Miocene age and comprises the following: *Ficus culebrensis*, *Myristicophyllum panamense*, *Inga oligocaenica*, *Cassia culebrensis*, *Hiraea oligocaenica*, *Banisteria praenuntia*, *Schmidelia bejucensis*, *Mespilodaphne culebrensis*, *Calyptranthes gatunensis*, *Melastomites miconioides*, *Rondeletia goldmani*, and *Rubiacites ixoreoides*.—*Edward W. Berry.*

PATHOLOGY

DONALD REDDICK, *Editor*

85. ANONYMOUS. **L'inspection phytopathologique des Etablissements agricoles, horticoles et viticoles (Communique). [Phytopathological inspection.]** Rev. Vit 48: 93–94. 1918.—Official order from the French Minister of Agriculture.

86. BERNATSKY, J. **Anleitung zur Bekämpfung der Peronospora des Weinstockes nach den neuesten Erfahrungen und Versuchsergebnissen. [Guide for control of Peronospora viticola according to latest experience and investigation.]** Zeitschr. Pflanzenkr. 28: 1–28. 1918. —Elementary treatise touching minutely on the details considered of importance in controlling downy mildew. Cultural practices of importance include; air drainage by weeding and by using only low-growing intercrops; prompt hardening of tissues by use of potash, lime, etc., and avoidance of nitrogenous fertilizers; also avoidance of summer pruning which forces new growth; proper pruning and summer tying to keep clusters and shoots well off the ground. —Really resistant varieties do not exist and one of the finest varieties, Chasselas, is most susceptible.—One to six treatments with prophylactic spray are required depending on raininess of the season. Details about apparatus and materials, preparation and use of Bordeaux mixture, care of machinery, etc.—When primary lesions appear treatment should be begun. Enough labor should be at hand to do the work promptly. Italian prisoners are apt at spraying, Russians are not so good.—When blue vitriol is an exorbitant price, "perocid" may be substituted. Review of European experience with this material indicates that 1.5 per cent "solution" is effective. Silver salt of nucleic acid and zinc sulfate with lime may be substituted. The latter material is effective in years of mild attack but does not adhere well, clogs nozzles, and if used late injures the must.—Proprietary copper mixtures are condemned. —Great emphasis placed on importance of covering every cluster and every leaf.—In small vineyards the leaves showing primary infection may be plucked and burned.—*D. Reddick.*

87. CAPUS, J. **Comparaison entre les effets des bouillies cupriques basiques et des bouillies acides. [Comparison of the effects of copper mixtures and acid mixtures on mildew of the vine.]** Compt. Rend. Acad. Agric. France 4: 86–90. 1918.—Acid and basic mixtures are equally efficacious against downy mildew of the vine (*P. viticola*), but for a period exceeding 20 days and during heavy rains, basic mixtures retain their efficacy better than acid ones. [Abst. in Internat. Rev. Sci. Pract. Agric. 9: 629–630. 1918.]—*D. Reddick.*

88. CAPUS, J. **Le mildiou. [Downy mildew of grapes.]** Rev. Vit. 48: 65–71. 1918.—Essentially a restatement of the facts discovered by author and others on relation of rains of various durations to infection by *Plasmopara viticola*, their relation to time of treatment, effect on the fungicides etc. Citations of conditions since 1901.—*D. Reddick.*

89. CAPUS, J. **Sur la maladie vermiculaire des pois dans la Gironde. [Nematode disease of peas in Gironde.]** Compt. Rend. Acad. Agric. France 4: 712–715. 1918.—*Heterodera schachti* is the chief cause of drying out of roots and gradual death of plants from base. Disease is serious in Gironde. *Fusarium vasinfectum* var. *pisi* is commonly present but is thought

usually to follow injury by nematodes and other agents.—Practice of fall-sowing of peas and of following peas with peas accounts for unusual prevalence in the region.—*Sclerotinia libertiana* has been observed to cause similar symptoms.—*D. Reddick.*

90. CLINTON, G. P. **Report on fungous diseases of 1917.** Rept. Conn. Veg. Grower's Assoc. 1917: 14–15. 1918.

91. CLINTON, G. P., AND W. E. BRITTON. **Spray calendar.** Connecticut Agric. Exp. Sta. Bull. 199: 53–98. 1918.—A brief illustrated account of the diseases and insect injuries of plants cultivated in Connecticut.

92. COOK, M. T. **Common diseases of berries.** New Jersey Agric. Exp. Sta. Circ. 88. *12 p., 6 fig.* (Revised.) 1918.—Symptoms, cause and control of the more common diseases of blackberries, raspberries, dewberries, gooseberries, currants, strawberries, and cranberries are discussed in a popular way.—*L. M. Massey.*

93. COOK, M. T. **Common diseases of garden vegetables and truck crops.** New Jersey Agric. Exp. Sta. Circ. 89. *24 p. 12 fig.* (Revised.) 1918.—A brief and popular discussion of symptoms and causes of diseases of garden vegetables and truck crops, together with specific and general recommendations for control.—*L. M. Massey.*

94. COOK, M. T. **Common diseases of shade and ornamental trees.** New Jersey Agric. Exp. Sta. Circ. 98. *27 p., 11 fig.* 1918.—Brief, popular discussion of the more common diseases of shade and ornamental trees under the headings of root, stem and foliage troubles, with recommendations for control. Attention is directed to the undesirable features of some trees; mechanical injuries and those resulting from fires, salt poisoning, gas, fumes and freezing; and to care and cultivation.—*L. M. Massey.*

95. COOK, M. T. **Common diseases of ornamental plants.** New Jersey Agric. Exp. Sta. Circ. 97. *23 p., 10 fig.* 1918.—Brief popular discussion of the more common diseases of ornamental plants are given, together with recommendations for control.—*L M. Massey.*

96. COOK, M. T., AND W. H. MARTIN. **Leaf blight of the tomato.** New Jersey Agric. Exp. Sta. Circ. 96. *4 p., 1 fig.* 1918.—Popular discussion of leaf blight (*Septoria lycopersici*) followed by a brief discussion of results of spraying experiments conducted in 1916 and 1917. In the experiments in 1916 the best results were obtained from using 4:4:50 Bordeaux mixture. In 1917 the standard 4:4:50 Bordeaux mixture gave the highest yield, while the best control of the fungus resulted from the use of a mixture consisting of 4 pounds copper sulphate, 2 pounds lime and 3 pounds resin fish-oil soap to 50 gallons of water. The manner of preparation of the mixtures is given.—*L. M. Massey.*

97. DRECHSLER, CHARLES. **The taxonomic position of the genus Actinomyces.** Proc. Nation. Acad. Sci. U. S. A. 4: 221–224. 1918.—"There seems to be no adequate reason why the genus should not be classed with the Hyphomycetes." [See Bot. Absts. 1, Entry 775.]

98. GÄUMANN, ERNST. **Über die Formen der Peronospora parasitica (Pers.) Fries.** [**The forms of Peronospora parasitica.**] Beih. Bot. Centbl. 35: 395–533. *Fig. 1–47.* Sept., 1918.—Morphological and statistical study bearing on the question of species in parasitic fungi.—*D. Reddick.*

99. HARTER, L. L. **Podblight of the Lima bean caused by Diaporthe phaseolorum.** Jour. Agric. Res. 11: 473–504. *Pl. 42–43, fig. 11.* 1917.—Podblight is a common and destructive disease of the Lima bean (*Phaseolus lunatus* L.) occurring both on the pods and stems. Previous to the present work only the pycnidial stage (*Phoma subcircinata*) of the causal fungus was known. Although Cooke and Ellis had described *Diaporthe phaseolorum* as occurring on the dead vines of Lima beans, its connection with *Phoma subcircinata* was not established.—The author wintered out vines and pods infected with *Phoma subcircinata* and

Diaporthe phaseolorum later developed thereon. Isolations from single ascospores gave a fungus identical morphologically with *Phoma subcircinata.* The pod blight disease was also produced in a large number of infection experiments by the fungus isolated from the ascospore. A study was also made of the mode of infection, effect of light on, and the relation of temperature to the growth of the fungus. [Abst. by Tobler in Zeitschr. Pflanzenkr. **28**: 334. 1918.]—*L. L. Harter.*

100. HARTER, L. L., J. L. WEIMER, AND J. M. R. ADAMS. **Sweet potato storage rots.** Jour. Agric. Res. **15**: 337–368. *Pl. 21–27.* 1918.—As a result of several years study sixteen different species of fungi were found to cause rots of sweet potatoes in storage or to reduce their market value. The greatest loss is caused by seven different species of fungi; viz., *Rhizopus nigricans, Sphaeronema fimbriatum, Diplodia tubericola, Diaporthe batatatis, Plenodomus destruens, Sclerotium bataticola,* and *Monilochaetes infuscans.* The remaining nine fungi; viz. *Mucor racemosus, Alternaria* sp., *Penicillium* sp., *Botrytis cinerea, Epicoccum* sp., *Gibberella saubinetii, Fusarium culmorum, Fusarium acuminatium, Trichoderma koningi,* were classed as minor rot producing organisms capable of causing decay only under especially favorable conditions. *Rhizopus nigricans* is well known to be the most destructive of the storage rot fungi. Infections with this organism were difficult to obtain under artificial conditions.—A study was made of the influence of temperature and humidity on infection and subsequent decay by these different species. In all cases with the exception of *Diplodia tubericola* a high relative humidity was found essential. The different species varied considerably in the range of temperature at which they would produce decay. Some of the minor rot organisms, as for example *Mucor racemosus, Fusarium culmorum* and *F. acuminatum,* decayed the sweet potatoes at a temperature considerably lower than that of the optimum temperature for the growth of the fungus.—*L. L. Harter.*

101. HEADLEE, T. J., M. T. COOK, M. A. BLAKE, AND A. J. FARLEY. **Spray calendar for the peach.** New Jersey Agric. Exp. Sta. Circ. 94. *4 p., 3 fig.* 1918.

102. HEADLEE, T. J., M. T. COOK, M. A. BLAKE, AND A. J. FARLEY. **Spray calendar for apples and quinces.** New Jersey Agric. Exp. Sta. Circ. 93. *4 p., 3 fig.* 1918.

103. ITO, SEIYA. **A preliminary report on a late-blight resistant strain of potato.** Ann. Phytopath. Soc. Japan **1**: 5–8. *Fig. 1.* 1918.—From a continued field observation in the different soils and climates during many years it may be sufficient to conclude that the new strain, "Ekishirazu," found in Japan, is highly resistant to the late blight. The variety was first imported from a foreign country (France?) in about 1903, and after successive culture during three to six years this highly resistant strain, now known as "Ekishirazu," originated among the progenies of the seedlings. The defect of the strain, however, is its lack of sweetness as compared with the taste of "Snowflake," and does not prove to be resistant to the early blight and rosette.—*T. Matsumoto.*

104. KILLER, J. **Versuche über die Eignung des essigsäuren Kupfers zur Bekämpfung des Steinbrandes. [Adaptability of copper acetate for the control of smut.]** Zeitschr. Pflanzenkr. **28**: 106–109. *4 fig.* 1918.—Seed of wheat, barley and oats of crop of 1911 very much injured by treatments for 14 hours with 0.5 per cent solution. This strength kills spores of *Tilletia tritici* very quickly. Later comparisons of copper acetate with formaldehyde, copper sulfate, corrosive sublimate and proprietary preparations ("Uspulun" and "Sublimoform") lead to the conclusion that it may be used for smut control in 0.5 per cent concentration, soaking 16 hours. Germination is retarded as compared with formaldehyde-treated seed but this is more than offset by the fact that disinfecting action is still effective in the soil and this is of importance at times.—*D. Reddick.*

105. KILLER, J. **Wurzelbrandbekämpfungsversuche bei Runkelrüben mit essigsäurem Kupfer im Vergleich mit anderen Beizmitteln. [Control of root rot of beets with copper acetate**

as compared with other fungicides.] Zeitschr. Pflanzenkr. 28: 109–110. *2 fig.* 1918.—Following substances tested by treating beet seed in various strength solutions and for varying lengths of time as indicated: Formaldehyde 0.1 per cent for thirty minutes and 0.2 per cent for five minutes, mercuric chloride 0.1 per cent for one hour and 0.2 per cent for five minutes; "Uspulun" 0.25 per cent for eight hours and 0.5 per cent for five minutes, copper sulfate, 0.5 per cent for twelve hours and 1 per cent for five minutes, copper acetate 0.1, 0.25 and 0.5 per cent for twelve hours and 1 per cent for five minutes. Root rot, caused by *Aphanomyces laevis* and *Phoma betae*, appeared in plants from untreated seed to extent of 54 per cent and in plants from treated seed in a range from 34 to 63 per cent, i.e., none of the treatments proved effective. "Uspulun" has been highly recommended for this disease. [Regarding it, see Bot. Absts. 2, Entry 115.]—*D. Reddick.*

106. Levine, Isaac, and Michael Levine. **Malignancy of the crown gall and its analogy to animal cancer.** Proc. Soc. Exp. Biol. Med. 16: 21–22. 1918.—"In a study reported recently on the influence of X-rays on the development of the crown gall, the writers have come to the conclusion that this growth presents an ideal material for the cellular study of the cancer problem. Dr. Erwin F. Smith, of Washington, considers this parasitic disease of plants to be identical with human cancer to such an extent that, since crown gall is caused by a microorganism, he maintains that all human cancers must be due to the same parasite. It seemed desirable to repeat Smith's experiments from the standpoint of human pathology and this was the object of the present investigation.—A large number and a great variety of plants were inoculated with a pure culture of *Bacterium tumefaciens* and a gross and microscopical study of the resulting crown galls was made. The analysis of the material shows that a certain number of these plant-tumors behave morphologically as well as biologically as benign growths. They grow very slowly, do not interfere with the development of the inoculated plant, and compress but do not injure the neighboring normal tissues. Other crown galls appear to be true malignant tumors. They dwarf the inoculated plant. The parts of the inoculated stem become necrotic above and even below the point of inoculation. Microscopically the galls show invasion and destruction of the neighboring normal tissues. In accordance with the findings of Smith a number of crown galls were obtained containing leafy shoots. Smith considers the latter condition to be analogous to human embryomata. A close microscopical study of the crown gall revealed characteristics which differ materially from the conditions obtained in animal cancer. In the majority of the specimens investigated the entire gall presents a uniform morphological appearance of small, young, undifferentiated cells. In other tumors the central growing part presents the usual appearance of a crown gall, while the periphery shows the development of adult differentiated tissue (parenchyma). This parenchyma is a part of the new growth and not of the normal tissues of the inoculated plant. The same is true of rudimentary organs (conducting system), or even a whole rudimentary organism (leafy shoot), which may appear at the periphery or in other parts of the ordinary crown gall. Such an appearance of highly differentiated tissues subsequently to and as a part of the development of a malignant tumor is unknown in animal cancer.—The conclusion to be arrived at from this study is that a fast developing simple crown gall presents a great deal of analogy to animal cancer and offers an ideal material for the cellular study of the latter condition. On the other hand the structure of the growing central part is identical in practically all the crown galls investigated thus far. It represents therefore only one type in the large group of pathological processes designated under the common name of cancer. It is hardly possible to assert on the basis of the study of the crown gall that all human cancers are formed through the activity of one and same microörganism."—*I. Levine and M. Levine.*

107. Lint, Henry Clay. **Seed and soil treatment for the control of potato scab.** New Jersey Agric. Exp. Sta. Circ. 95. *4 p., 1 fig.* 1918.

108. Montemartini, L. **Spora la resistenza delle quercie all'oidio.** Riv. Pat. Veg. 9: 77–79. 1919.—As previously reported by other writers, various American species of oaks

(*Quercus coccinea, Q. rubra, Q. stellata* and others) were found to be immune to attacks of powdery mildew. Leaves of these resistant American oaks were collected early in September and determinations of nitrogen content, total, soluble and insoluble, were made. It was found that only a little over one-tenth of the nitrogen present was soluble. This agrees with the previously published report of Pantanelli, that in susceptable oaks the soluble nitrogen forms four to seven-tenths of the total nitrogen while in resistant oaks it goes down to three-tenths.—*F. M. Blodgett.*

109. NISHIMURA, MAKOTO. **A carrier of the mosaic disease.** Bull. Torrey Bot. Club 45: 219–231. *Pl. 7.* 1918.—*Solanum aculeatissimum*, apple of Sodom, is susceptible to mosaic, of tobacco, showing typical symptoms. *Physalis alkekengi* fails to show any symptoms upon inoculation with the virus but when the expressed juice of such inoculated plants is used for inoculating susceptible species the disease appears in the usual incubation period and in typical form. Concise experimental data are furnished to support the conclusions.—*D. Reddick.*

110. SAWADA, KANEYOSHI. **A new rust-fungus parasitic on the cultivated rose.** [Text in Japanese]. Trans. Sapporo Nat. Hist. Soc. 7: 36–40. *Fig. 1–3.* 1918.—The fungus forms brown spots scattered on the living leaves, stipules, young twigs, fruits, etc. of *Rosa indica* var. *formosana* grown in Formosa, Japan, and frequently induces great damage in the rose nursery. No spores except teleutospores were observed in the microscopical investigation. From the morphological character of the teleutospores the author proposes for the causal fungus the name *Kuehneola rosae.* The morphological description is given as follows: spores 15–52 × 14–28μ, one-celled, 2–5 forming a chain. This is closely allied to *Kuehneola japonica* found on *Rosa,* but is distinguished by the number of the larger sized teleutospores in a chain. [See Bot. Absts. 2, Entry 784.]—*T. Matsumoto.*

111. SHIMBO, IPPO. **Studies on some insect-galls in Japan.** [Text in Japanese.] Bot. Mag. Tôkyô 32: 121–128. *Fig. 1–3.* 1918.—The author gives detailed descriptions of morphology of two insect-galls found in Japan, (1) on the leaves of *Illicium anisatum* and (2) on the leaves of *Machilus thunbergii.* The distribution of starch, sugar, protein, fat, tannin, inorganic salts and certain enzymes in the tissue of both diseased and healthy leaves is also reported. From the experiment it is inferred that tannin, starch and sugar are a little more concentrate in gall-tissue of Illicium than in healthy tissue. No crystals of calcium oxalate are observed in the gall-tissue. The life-history of the causal insects and the nature of the parasitic fungi in the galls is also described to a certain extent.—*T. Matsumoto.*

112. STAKMAN, E. C., AND A. G. TOLAAS. **The control of brown rot of plums and plum pocket.** Minnesota Hort. 46. May, 1918. [*Illust.*]—Brown rot of plums, which is serious in Minnesota nearly every year, is discussed and satisfactory methods of control are outlined. Plum pocket (caused by *Exoascus pruni*), which has been under investigation at the Minnesota Experiment Station for about five years, is more difficult to control than brown rot. Recommendations for the control of plum pocket are given, as follows: (1) Destroy all mummied plums; (2) prune out and burn affected twigs; (3) spray with either Bordeaux mixture, 3–4–50, or lime-sulfur 1–40, as for brown rot. An application made when the flowers are just beginning to show color seems essential. It is suggested that a dormant spray be tried.—*L. R. Hesler.*

113. STRICKLAND, F. L., AND N. R. PEET. **The spraying service in Niagara county in 1917.** New York Dept. Farms and Markets, Agric. Bull. 106: 1–147. *Fig. 1–37.* 1918.—An account of an effort by the Farm Bureau of Niagara County, New York, coöperating with other State and Federal agencies, to furnish a large number of fruit growers with accurate, timely information on spraying for the control of fungous diseases and insect pests. Some of the methods employed were original and unique. By means of a telephone relay system and code messages the information was disseminated with remarkable rapidity. Instructions were given for the control of scab and codlin moth in apple orchards; psylla in pear orchards; yellow

leaf, curculio and red mite in plum orchards; yellow leaf and fruit fly in cherry orchards; curculio and fruit spot in quince orchards; and downy mildew in vineyards. In making his recommendations for treatment the expert in charge was guided by the conditions in representative ("criterion") orchards kept under close observation in different parts of the county. These recommendations are given in detail together with a large number of data on the results obtained by orchardists who carried them out. The authors consider the undertaking to have been highly successful.—*F. C. Stewart*

114. Tobler, G. **Sulfadherent.** Zeitschr. Pflanzenkr. 28: 210. 1918.—This is the name of a preventive which H. Callier, of Lausanne, has found valuable for [the mildews? of] grapes. It consists essentially of a mixture of sulfur, copper sulfate and nicotine. It adheres better than other mixtures. Two applications are enough [to control the mildews?], the first treatment being made about June 1, the second late in July. The material is applied dry. It seems also to have value for control of "potato diseases."—*D. Reddick.*

115. Weck, [—] **"Uspulun," ein neues Beizmittel für Getreide. ["Uspulun," a new disinfectant for grains.]** Illustr. landw. Zeitg. 36: 552. 1916.—Effective agent is a mercury salt of a chlorophenol. In its effect on germination of the seed and on control of smut it has proved efficient in comparison with other disinfectants. [Through abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 50. 1918.]—*W. H. Rankin.*

116. Weiss, J. E. **Einfluss der Witterungsverhältnisse auf das Auftreten von Pflanzenkrankheiten und tierischen Schädlingen 1916 und 1917. I. [Influence of weather conditions on the occurrence of plant diseases and animal pests in 1916 and 1917. I.]** Zeitschr. Pflanzenkr. 28: 116–142. 1918. Same general title, II, III, IV. *Ibid.* 28: 201–210. 1918.—In gathering material for "Herbarium pathologicum" (Weigel: Leipzig) during wet season, 1916 and dry season, 1917, observations were made on prevalence of a large number of diseases which are noted, each in a short paragraph. General conclusion is that wet weather favors and dry weather suppresses the appearance of diseases caused by following organisms: *Phytophthora infestans, Plasmopara viticola, Peronospera viciae, P. nivea, P. schleideni, Bremia lactucae, Cystopus candidus, C. tragopogonis, Ustilago spp., Uromyces betae, Puccinia poori, P. graminis, P. coronifera, Phrgmidium subcorticium, Ph. violaceum, Cronartium paeoniae, Melampsora salicina, Sphaerotheca pannosa, Erysiphe polygoni, Phyllactinia corylea, Uncinula necator, Microsophaera alni, Entomosporium maculatum, Marssonina juglandis, Clasterosporium carpophilum, Fusicladium dendriticum, F. pirinum, Gloeosporium ribis, G. lindemuthianum, G. nervisequum, Actinonema rosae, Phyllosticta fragariicola, Ph. rosae, Ascochyta pisi, Septoria piricola, S. apii, Epichloë typhina, Claviceps purpurea, Rhytisma acernum, Ceratophorum setosum.*—While infection usually occurs in young leaves the cuticle of which is not fully developed, in some cases infection comes only after full development. Here are found the following parasites: *Entomosporium maculatum, Cronartium ribicola, Ceratophorum setosum.*—The following are dependant on wet soil: *Plasmodiophora brassicae, Tilletia tritici,* and the true loose smuts.—There is a considerable group of parasites unclassified.—II. Origin of certain leaf spots on various ornamental plants is discussed. These appear in rainy seasons and are caused by shading and the action of various saprophytes which attack primarily the clinging petals of fallen blossoms.—III. Effect of seasons on a long list of insect pests.—IV. Control of mustard by dusting with calcinated iron sulfate or with 40 per cent mixture of potassium chloride or nitrate in lime dust on moist foliage. Iron-sulfate spray (15–20 per cent) is also effective.—*D. Reddick.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HENRY KRAEMER, *Editor*

117. HOLM, T. **Juglans nigra L. and J. cinerea L.** Merck's Rept. 27: 115–117, 168–170. 1918.—*Juglans nigra*, a large tree of the Juglandaceae is of some importance medicinally and as a dyestuff, the rind of the green fruit and the bark of the root being used. The staminate and pistillate flowers and the internal structure of the vegetative organs are figured and described in detail. The bark of the root of *J. cinerea* is used similarly, and the structure is said to be identical with that of *J. nigra.*—*J. Moser.*

118. HOLMES, E. M. **Ghassoul—A Morocco Drug.** Pharm. Jour. 101: 317. 1918.—A packet of stalks and buds included in a collection of Morocco drugs brought to England by Dr. Arthur Leared in 1873 and used in Morocco for cleaning woolen clothes, was approximately identified at that time as derived from the genus *Mesembryanthemum.*—M. E. Wilczch (Schiw. Apoth. Zeit. Oct. 3, 1918) states that a sample of Ghassoul, which is used as a substitute for soap in Abyssinia, contained some ripe seeds which upon planting developed into fine specimens of *Mesembryanthemum nodiflorum* and *M. crystallinum*, the latter in smaller proportion.—This apparently completes the identification of Dr. Leared's sample. The ash of species of this genus yields a very pure soda but the detergent qualities of the plant probably are due to saponin.—*E. N. Gathercoal.*

119. GREENISH, HENRY G. **Examination of a Transvaal Croton bark.** Pharm. Jour. 101: 289. 1918.—This bark obtained from South Africa where it is pronounced as an excellent remedy, in 2-grain doses, for bilious malarial fever, was referred at the Royal Botanic Gardens, Kew, to the tree, *Croton Gubouga* S. Moore, a species widely spread in Nyasaland, Rhodesia and Portuguese East Africa.—In external appearance the bark is 2 to 3 mm. thick, generally gray in color, with corky warts or longitudinal bands of cork. The bark possesses a persistently acrid, somewhat numbing taste. Microscopically, bast fibers, single and in groups, much thickened and distinctly striate were found; sclerenchyma cells, about the size of the parenchyma and formed into small masses were abundant; calcium oxalate crystals in prisms and rosettes were very numerous; a few small starch grains and small oil drops were found in the parenchyma cells and in the longitudinal section some elongated cells with the inner lamellae of the walls suberized and containing yellowish granular secretion were seen.—Upon exhaustion with petroleum spirit, 2.54 per cent of thick fatty oil, exceedingly acrid in taste, was obtained. Further exhaustion with ether and chloroform yielded very small, slightly acrid residues, but alcohol then removed 2.71 per cent of extractive, acrid in taste. Alcohol of 50 per cent strength apparently extracts the drug. No volatile principles were obtained, nor alkaloids nor bitter principles. The viscid oil was in too small quantity for further examination.—This bark therefore corresponds, in many respects, to some other Croton barks, especially to that of *Croton Tiglium* which, is extremely acrid.—*E. N. Gathercoal.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

GENERAL

120. HARVEY, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83–112. *Pl. 7–11, A*; *Fig. 1–3.* 1918.—The author makes an extensive study of frost injury to various plants and concludes that it varies largely with the plant. Succulent plants exhibit the appearance of injected areas over the leaf surface; leaves of cabbage and the like show stimulated growth with ultimate production of tumors; and leaves of tomato and *Coleus* are killed. Various suggestions are offered in explanation of the effects of frost injury, the increase of hydrogen-ion concentration being considered the

principal factor. Less injury is noted with plants that have been hardened, and the phenomenon is explained upon the grounds that the process of hardening so alters the constituents of the protoplasm that the precipitation of proteins is averted. [See Bot. Absts. 2, Entry 374.]—*R. W. Webb.*

121. Stanford, Ernest E., and Arno Viehoever. **Chemistry and histology of the glands of the cotton plant, with notes on the occurrence of similar glands in related plants.** Jour. Agric. Res. 13: 419–435. *Pl. 48–50.* 1918.—See Bot. Absts. 1, Entry 1597.

122. True, Rodney H., Otis F. Black, James W. Kelly, H. H. Bunzell, Lon A. Hawkins, Samuel L. Jodidi, and Edward H. Kellogg. **Physiological studies of normal and blighted spinach.** Jour. Agric. Res. 15: 369–405. 1918.—A biochemical study of a "mosaic" disease is elaborated, dealing with ash, carbohydrate, nitrogen, and oxidase contents, and activities in normal and in blighted spinach.—*R. W. Webb.*

DIFFUSION AND PERMEABILITY

123. Osterhout, W. J. V. **Conductivity as a measure of permeability.** Jour. Biol. Chem. 36: 485–487. 1918.

124. Osterhout, W. J. V. **A method of measuring the electrical conductivity of living tissues.** Jour. Biol. Chem. 36: 557–568. *Fig. 1–8.* 1918.

125. Osterhout, W. J. V. **Note on the effect of diffusion upon the conductivity of living tissue.** Jour. Biol. Chem. 36: 489–490. 1918.

WATER RELATIONS

126. Bakke, Arthur L. **Determination of wilting.** Bot. Gaz. 66: 81–116. *Fig. 1–5.* 1918.—Daily march of transpiration of *Helianthus annuus* is studied by the standardized hygrometric paper method. [See Bot. Absts. 1, Entry 820.]—*R. W. Webb.*

127. Kidd, F., and C. West. **Physiological pre-determination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield. I. The effects of soaking seeds in water.** Ann. Appl. Biol. 5: 1–10. *Pl. 1–2.* 1918.—The experiments described lead to the conclusions that soaking seed in distilled water previous to sowing may have a marked effect upon the subsequent growth of the plant, that a germination test cannot be relied upon in the least to give any criterion of what this effect may be, and that the nature of the effect is strongly specific, quite different results being obtained by similar treatment of closely allied plants.—*S. M. Zeller.*

128. Miller, Edwin C., and W. B. Coffman. **Comparative transpiration of corn and the sorghums.** Jour. Agric. Res. 13: 579–604. *Pl. 62–63, Fig. 1–13.* 1918.—When varieties of corn and sorghum were grown in large galvanized iron cans, it was found that any variety of corn always transpired more per plant than any sorghum, but the transpiration per unit area was greater in the case of the sorghum than in that of the corn, the difference being due to the extent of the leaf surfaces. Differences of transpiration were more marked after full leaf development and under severe climatic conditions.—*R. A. McGinty.*

MINERAL NUTRIENTS

129. Fenn, W. O. **The effects of electrolytes on gelatin and their biological significance. II. The effect of salts on the precipitation of acid and alkaline gelatin by alcohol. Antagonism.** Jour. Biol. Chem. 33: 439–451. *Fig. 1–6.* 1918.

130. Fenn, W. O. **The effects of electrolytes on gelatin and their biological significance. III. The effects of mixtures of salts on the precipitation of gelatin by alcohol. Antagonism.** Jour. Biol. Chem. 34: 141–160. *Fig. 1–9.* 1918.

131. FENN, W. O. **The effects of electrolytes on gelatin and their biological significance. IV. The precipitation of gelatin by mixtures of salts.** Jour. Biol. Chem. 34: 415–428. *Fig. 1–5.* 1918.

132. LOEB, JACQUES. **The influence of neutral salts, bases, and acids on the precipitability of gelatin by alcohol.** Jour. Biol. Chem. 34: 489–501. 1918.

133. LOEB, JACQUES. **Ionization of proteins and antagonistic salt action.** Jour. Biol. Chem. 33: 531–549. 1918.

134. LOEB, JACQUES. **The origin of the conception of physiologically balanced salt solutions.** Jour. Biol. Chem. 34: 503–504. 1918.

135. MILLAR, C. E. **Relation between biological activities in the presence of various salts and the concentration of the soil solution in different classes of soil.** Jour. Agric. Res. 13: 213–223. 1918.—From data obtained by the use of different soils containing varying amounts of salts and dried blood, the author concludes that it is improbable that in the ammonification of the dried blood, osmotic pressure is the governing factor. The nature of the soil used apparently modifies the effect of the various salts on ammonification to a considerable extent.—*R. A. McGinty.*

136. TOTTINGHAM, W. E. **The sulfur requirement of the red clover plant.** Jour. Biol. Chem. 36: 429–438. *Fig. 1–2.* 1918.

METABOLISM (GENERAL)

137. BERTHELOT, ALBERT. **Recherches sur la flore intestinale contribution a l'étude des microbes producteurs de phénol principaux caracteres du Bacillus phenologenes. [A study of intestinal microbes producing phenol, especially Bacillus phenologenes.]** Ann. Inst. Pasteur 32: 17–36. *Fig. 1–2.* 1918.—After referring briefly to the production of phenol by the organisms of the intestinal tract the author describes in detail the characteristics of the species mentioned above on a variety of culture media. On a culture medium containing tyrosin he was unable to determine the presence of any *P*-cresol but invariably, even in media slightly aerated, a definite test for phenol. Furthermore, the cultures showed a reddish tint analogous to that of phenol exposed to the air, and this appeared in all except the anaerobic cultures. Many data are given showing the influence of the culture medium upon the production of phenol.—*B. M. Duggar.*

138. BLISH, M. J. **A study of the non-protein nitrogen of wheat flour.** Jour. Biol. Chem. 33: 551–559. 1918.

139. CHICK, HARRIETTE, AND E. MARGARET HUME. **The effect of exposure to temperatures at or above 100°C. upon the substance (vitamine) whose deficiency in a diet causes polyneuritis in birds and beri-beri in man.** Proc. Roy. Soc. London B, 90: 60–68. 1918.—An exposure of wheat embryo to a temperature of 100°C. for two hours produced no significant loss in anti-neuritic "vitamine," but at a temperature of 120° there was swift destruction of the anti-neuritic properties.—*B. M. Duggar.*

140. CHICK, HARRIETTE, AND E. MARGARET HUME. **The distribution in wheat, rice, and maize grains of the substance, the deficiency of which in a diet causes polyneuritis in birds and beri-beri in man.** Proc. Roy. Soc. London B, 90: 44–60. 1918.

141. DUTCHER, R. ADAMS. **Vitamine studies. III. Observations on the curative properties of honey, nectar, and corn pollen in avian polyneuritis.** Jour. Biol. Chem. 36: 551–555. 1918.

142. DUTCHER, R. ADAMS, AND FERDINAND A. COLLATZ. **Vitamine studies II. Does water-soluble vitamine function as a catalase activator?** Jour. Biol. Chem. 36: 547–550. 1918.

143. Everest, Arthur Ernest. **The production of anthocyanine and anthocyanidins. Part III.** Proc. Roy. Soc. London B, 90: 251–265. 1918.—Continuing investigations begun several years earlier it is pointed out that evidence is required to determine whether anthocyan pigments produced in plants originate via flavonols or by direct synthesis, independent of the former. An elucidation of this point is the direction towards which the investigations have naturally turned in the present paper. A study of the *Viola* pigments has been begun with some results bearing upon the problem indicated. The work seems to indicate that in the variety "Black Knight" there occurs a glucoside of myricetin side by side with a glucoside of delphinidin, thus in the same flower an anthocyan pigment and a flavonol derivative from which it would be produced by reduction. The reactions of anthocyan pigments are considered in some detail. The author's anthocyanidin is shown to be identical with delphinidin. In further work it is proposed to determine whether or not the two classes of pigments, anthocyan, and flavone derivatives, occur attached to the same sugars.—*B. M. Duggar.*

144. Greig, E. D. W., and Dagmar F. Curjel. **Report on the anti-beri-beri vitamine content of three kinds of atta biscuits.** Indian Jour. Med. Res. 6: 56–67. 1918.—Fifteen per cent atta biscuit contains considerable amount of anti-beri-beri vitamine.—*R. W. Webb.*

145. Hogan, Albert G. **The nutritive properties of kafirin.** Jour. Biol. Chem. 33: 151–159. *Charts 1–4.* 1918.

146. Johns, Carl O., and Lewis H. Chernoff. **The globulin of buckwheat, Fagopyrum fagopyrum.** Jour. Biol. Chem. 34: 439–445. 1918.

147. Johns, Carl O., A. J. Finks, and C. E. F. Gersdorf. **Globulin of the cocoanut, Cocos nucifera. 1. Preparation of cocoanut globulin.** Distribution of the basic nitrogen in cocoanut globulin. Jour. Biol. Chem. 37: 149–153. 1919.—The globulin prepared contains all the basic amino acids necessary for maintenance and growth. The free amino acid is about equal to one-half the lysine nitrogen as determined in the Van Slyke analysis.—*B. M. Duggar.*

148. Johns, Carl O., and A. J. Finks. **Stizolobin of the Chinese velvet bean, Stizolobium niveum.** Jour. Biol. Chem. 34: 429–438. 1918.

149. Johns, Carl O., and D. Breese Jones. **The determination of tyrosine in proteins.** Jour. Biol. Chem. 36: 319–322. 1918.

150. Jones, D. Breese, and Carl O. Johns. **The hydrolysis of kafirin.** Jour. Biol. Chem. 36: 323–334. 1918.

151. Kuriyama, Shigenobu. **The physiological behavior of raffinose. II.** Jour. Biol. Chem. 34: 321–333. 1918.

152. Levene, P. A. **The structure of yeast nucleic acid. III. Ammonia hydrolysis.** Jour. Biol. Chem. 33: 425–428. *Fig. 1.* 1918.

153. Levene, P. A. **The structure of yeast nucleic acid. II. Uridine-phosphoric acid.** Jour. Biol. Chem. 33: 229–234. *Fig. 1–2.* 1918.

154. Levene, P. A., and C. J. West. **Lecithin. II. Preparation of pure lecithin; composition and stability of lecithin cadmium chloride.** Jour. Biol. Chem. 34: 175–186. 1918.

155. McCollum, E. V., N. Simonds, and H. T. Parsons. **Supplementary relationships between the proteins of certain seeds.** Jour. Biol. Chem. 37: 155–178. *Charts 1–77.* 1919.—Numerous data are given showing the degree to which the proteins from different seeds supplement each other, all experiments being conducted with rats.—*B. M. Duggar.*

156. McCOLLUM, E. V., N. SIMMONDS, AND H. T. PARSONS. **The dietary properties of the potato.** Jour. Biol. Chem. 36: 197-210. *Charts 1-7.* 1918.

157. OSBORNE, THOMAS B., AND LAFAYETTE B. MENDEL. **The vitamines in green foods.** Jour. Biol. Chem. 37: 187-200. *Charts 1-3.* 1919.—It is concluded that green vegetables are an important addition to the diet of man because such staples as meat, cereals, potatoes, sugar, and fats probably yield an insufficient quantity of either of the vitamines to meet the dietary requirements.—*B. M. Duggar.*

158. SUMNER, JAMES B. **The globulins of the Jack bean, Canavalia ensiformis.** Jour. Biol. Chem. 37: 137-141. *Pl. 1.* 1919.—A preliminary paper in which the author reports the isolation to two new crystalline globulins, named concanavalin A and concanavalin B, and of one new non-crystalline globulin—canavalin—from the Jack bean.—*B. M. Duggar.*

159. WALLIS, R. L. MACKENZIE. **Report upon the food value of the ground-nut.** Indian Jour. Med. Res. 6: 46-55. 1918.

160. OSBORNE, THOMAS B., AND LAFAYETTE B. MENDEL. **Nutritive factors in plant tissues. I. The protein factor in the seeds of cereals.** Jour. Biol. Chem. 34: 521-535. *Chart 1.* 1918.

161. PACINI, AUGUST J. P., AND DOROTHY WRIGHT RUSSELL. **The presence of a growth-producing substance in cultures of typhoid bacilli.** Jour. Biol. Chem. 34: 43-49. *Fig. 1-4.* 1918.

162. SAMPSON, HOMER C. **Chemical changes accompanying abscission in Coleus Blumei.** Bot. Gaz. 66: 32-53. 1918.—Using microchemical methods, the author finds that abscission of leaves in *Coleus Blumei* results from an excess amount of pectic acid which is formed by the conversion of cellulose into pectose and the further transformation of the pectose into pectin and pectic acid.—*R. A. McGinty.*

163. SHERMAN, H. C., AND JET C. WINTERS. **Efficiency of maize protein in adult human nutrition.** Jour. Biol. Chem. 35: 301-311. 1918.

164. STEENBOCK, H., P. W. BOUTWELL, AND HAZEL E. KENT. **Fat-soluble vitamine. I.** Jour. Biol. Chem. 35: 517-526. *Charts 1-16.* 1918.

165. STEENBOCK, H., HAZEL E. KENT, AND E. G. GROSS. **The dietary qualities of barley.** Jour. Biol. Chem. 35: 61-74. *Charts 1-20.* 1918.

166. SUGIURA, KANEMATSU, AND STANLEY R. BENEDICT. **The nutritive value of the banana.** Jour. Biol. Chem. 36: 171-189. *Charts 1-16.* 1918.

METABOLISM (NITROGEN)

167. BRADLEY, HAROLD C., AND M. STARR NICHOLS. **Nitrogen content of bacterial cells. I. Method.** Jour. Biol. Chem. 33: 525-529. 1918.

168. DAVIDSON, J. **Do seedlings reduce nitrate?** Jour. Biol. Chem. 37: 143-148. 1919.—Experiments on a considerable scale were arranged with seedlings of wheat, corn, barley, oats, rye, and rice, for the most part floated on solutions of sodium nitrate of a concentration of 1000 parts per million. Colorimetric tests for nitrite were made about twenty-four hours apart for several days. In general it is shown that nitrates are not reduced by seedlings in the outside medium as a result of their metabolic processes. Nitrate reduction, fluctuating in amount from day to day, does occur when the surfaces of the seeds come in contact with the salt solution, and the data indicate that such reduction is a result of bacterial activity.—*B. M. Duggar.*

169. Fred, E. B., and Audrey Davenport. **Influence of reaction on nitrogen-assimilating bacteria.** Jour. Agric. Res. 14: 317–336. *Fig. 1.* 1918.—Behavior of legume bacteria and *Azotobacter* toward small amounts of acid or alkali depends on the nature of the medium and the dissociation of the acid and alkali; the sensitiveness of various organisms to such reactions is determined.—*R. W. Webb.*

METABOLISM (ENZYME ACTION)

170. Abderhalden, E., and H. Schaumann. **Studien über die Beeinflussbarkeit der Wirkung einiger Fermente der Hefe durch Stoffe, die sich mit Alkohol aus der Hefezelle abtrennen lassen. [The influence of alcohol-soluble substances from the yeast cell on the activity of certain yeast enzymes.]** Fermentforschung 2: 120–150. *Pl. 1–2.* 1918.

171. Abderhalden, E., and A. Fodor. **Forschungen über Fermentwirkung. III. Mitteilung: Weitere Studien über die Adsorption von Aminosäuren und Polypeptiden und ferner von verschiedenen Kohlehydraten durch Tierkohle. [Enzyme action. Further studies on adsorption of amino acids, polypeptids and carbohydrates by animal charcoal.]** Fermentforschung 2: 151–166. *Fig. 1–4.* 1918.

172. Abderhalden, E., and A. Fodor. **Forschungen über Fermentwirkung. IV. Mitteilung: Weitere Studien über die Adsorption der Gemische von Aminosauren mit Polypeptiden und anderen Substanzen. Das Verhalten von Aminosauren und Polypeptiden gegenüber Eiweisslösungen, Blutserum und bei der Koagulation von Solen. V. Mitteilung: Ultrafiltrationsversuche mit Mischungen bestehend aus Aminosäuren bzw. Polypeptiden und Hefemazerationssäften. Stützen für den kolloiden Zustand der Fermente und Erweiterung der Adsorptionstheorie. [Enzyme action. IV. Adsorption of mixtures of amino acids and polypeptids and the relation of these to albumin solutions and blood serum and to the coagulation of soles. V. Ultrafiltration with mixtures of amino acids, polypeptids and macerated yeast juice. The colloidal condition of enzymes.]** Fermentforschung 2: 211–250. *1 fig.* 1918.

173. Crocker, William, and George T. Harrington. **Catalase and oxidase content of seeds in relation to their dormancy, age, vitality, and respiration.** Jour. Agric. Res. 15: 137–174. *Fig. 1–3.* 1918.—Experimental methods and work are cited, and an extensive study is made of catalase and oxidase of many seeds under various conditions.—*R. W. Webb.*

174. Euler, H., O. Svanberg, and S. Heintze. **Quantitative Bestimmungen der enzymatischen Tätigkeit in lebenden Zellen. I. [Quantitative determinations of enzyme activity in living cells.]** Fermentforschung 2: 194–199. 1918.

175. Falk, I. S. **The influence of certain salts on enzyme action.** Jour. Biol. Chem. 36: 229–247. 1918.

176. Jewell, Minna D., and Howard B. Lewis. **The occurrence of lichenase in the digestive tract of invertebrates.** Jour. Biol. Chem. 33: 161–167. 1918.

177. Sherman, H. C., A. W. Thomas, and M. E. Baldwin. **Influence of hydrogen ion concentration upon enzyme activity of three typical amylases.** Proc. Soc. Exp. Biol. Med. 16: 17–18. 1918—"Pancreatic and malt amylase and the amylase of *Aspergillus oryzae* (prepared from taka-diastase) have been selected as representative of the starch-splitting enzymes of the higher animals, higher plants, and fungi respectively. Laboratory methods for the purification of each of these amylases have been described in previous papers. The present experiments were performed with enzyme preparations which had been purified in accordance with these methods. The experiments establish for each of the three amylases the limits of hydrogen ion concentration within which any enzymic activity is shown, and the form of the curve representing the activities at all concentrations of hydrogen ion between these limits. The investigation was carried out with the aid of a grant from the Carnegie Institution of Washington."—*H. C. Sherman.*

178. SVANBERG, OLOF. **Enzymatische Untersuchungen einer Torula-Hefe. [Enzymatic studies of a Torula.]** Fermentforschung 2: 201–211. *Fig. 1.* 1918.—The author details experiments with a *Torula*, not previously investigated, in respect to determinations of the velocity of fermentation, the increase in cell number, and the inversion capacity per cell and per gram dry weight. It is shown that ferment capacity is much like that of known culture yeasts. No organic phosphate compounds could be identified.—*B. M. Duggar.*

179. WOLFF, J., AND B. GESLIN. **Étude des produits de dégradation diastasique de l'inuline dans la racine de chicorée. [Decomposition products of inuline in chicory roots by enzyme action.]**. Ann. Inst. Pasteur 32: 71–96. 1918.—It is shown that aside from inulin there may be found in the plant investigated certain products of less molecular weight which are designated inulids. These bodies are non-reducing and they are attacked by certain yeasts, whereas inulin is not. The roots harvested one month also exhibit a carbohydrase (inulase) slightly active and easily decomposable, likewise a very small amount of reducing sugar. From a study of roots which had been stored two months the author concludes that there is strong presumptive evidence indicating the existence in the root as well as in certain yeasts of the same enzyme acting upon inulids and not upon inulin. The inulin ferment invariably acts slowly both within the plant and through *in vitro* experiments. The inulids studied are tentatively grouped in three classes according to the quantities of alcohol yielded upon fermentation.—*B. M. Duggar.*

REGENERATION

180. BRIERLEY, W. B. **On cell-regeneration in Botrytis cinerea.** Ann. Bot. 32: 601–604. *Fig. 1–3.* 1918.—Types of injury which stimulate a healing reaction are grouped as (1) acute flexion of cells; (2) punctures or minute wounds; (3) relatively large lesions. Two distinct regenerative processes are involved, i.e., (1) restitution of the original cell wall, and (2) formation of a completely new membrane about the escaped protoplasm. Since the protoplasm still lives when a part is thus in a free plasmodial state the Swedish conception of mycoplasm should not be ignored. The author refers to an unpublished work in which he describes naked hyphae of *Botrytis cinerea* existing as free protoplasmic substance in the tissues of *Aesculus Paria.*—*S. M. Zeller.*

181. LOEB, JACQUES. **Healthy and sick specimens of Bryophyllum calycinum.** Bot. Gaz. 66: 69. 1918.—Replying to a criticism of his views in regard to the production of shoots by the leaves of abnormal plants of *B. calycinum*, the author points out that the photograph of the plant referred to by Miss E. L. Braun in her paper (Bot. Gaz. 65: 191. 1918), shows it to have been an abnormal and not a normal plant, as assumed, and that it was therefore not exceptional in producing shoots from the leaves while the latter were still attached to the parent.—*R. A. McGinty.*

182. LOEB, JACQUES. **The chemical mechanism of regeneration.** Ann. Inst. Pasteur 32: 1–16. *Fig. 1–3.* 1918.—The material in this paper has been previously abstracted. [Bot. Absts. 1, Entries 68, 736].

TEMPERATURE RELATIONS

183. HARTLEY, CARL. **Stem lesions caused by excessive heat.** Jour. Agric. Res. 14: 595–604. *Fig. 1.* 1918.

184. VINALL, H. N., AND H. R. REED. **Effect of temperature and other meteorological factors on the growth of sorghums.** Jour. Agric. Res. 13: 133–147. *Pl. 11–12.* 1918.—From observations upon sorghums growing in localities with widely varying meteorological conditions, the author concludes that due to its semitropical adaptations, sorghum will not thrive in regions of low temperatures and that a high percentage of sunshine is probably an important factor in growth. The effect of weather conditions upon germination, flowering and fruiting, yield of seed, and number of leaves per plant is considered.—*R. A. McGinty.*

LIGHT RELATIONS

185. Laroquette, Miramond de. **Experiences sur l'action bactéricide de la lumière solaire (lumière blanche totale et lumières partielles ou de couleurs). [The bactericidal action of sunlight and of light of various colors.]** Ann. Pasteur 32: 170–192. *Fig. 1–3.* 1918.—The author was impressed by the necessity of investigating more completely the action of light of various wave lengths aside from ultraviolet, to which so much attention has already been given. For a considerable number of the experiments use was made of houses constructed with glass of different colors, installed at Algiers, for an extended investigation of the effects of blue, green yellow, and red lights upon various organisms. A spectrographic examination of the glass was made and the chemical values determined. Extensive experiments were made with cultures of six species of microorganisms on various media. In general, it is stated that sunlight is only bactericidal when intense, or when long continued, acting especially at the surfaces of dry media and in the air, whereas in liquid media there is much slower action. White light is much more injurious than "partial" light of any color. Diffuse light is insufficient. Of the colored lights indicated blue is slowly bactericidal but much less than white. After the blue follow respectively yellow, red, and green. It is concluded that the visible part of the solar spectrum is the most active, the elimination of ultraviolet scarcely sensibly diminishing the injurious action. The bactericidal power lies both in the chemical and in the dehydrating action. In a practical way, in hygiene and therapeutics, little stress may be laid upon the bactericidal action of sunlight, owing to its small penetrating power. Similarly, in heliotherapy it is only cutaneous affections which may be successfully treated.—*B. M. Duggar.*

186. Schanz, Fritz. **Wirkungen des Lichts auf die Pflanze. [The effects of light on plants.]** Biol. Zentralbl. 38: 283–296. *Fig. 1–5.* 1918.—After a discussion of the effect of ultraviolet light upon certain proteins the author proceeds to consider the influence of light of various wave lengths upon the activities of the cell and of the plant in general. Special attention is drawn to the character of the daylight to which plants are exposed at different periods of the year, and to such light modified by the prevalent atmospheric conditions. A few simple experiments were made, and the results of these, together with observations at various altitudes, led to the conclusion that in general the low and sturdy vegetation form of the high mountains is promoted by the shorter wave lengths. As this stimulus declines toward the plains, so the increased length of the plant becomes more marked.—*B. M. Duggar.*

187. Sierp, Hermann. **Über die Lichtquellen bei pflanzenphysiologischen Versuchen. [Sources of light for plant physiological experiments.]** Biol. Zentralbl. 38: 221–257. *Fig. 1–10.* 1918.—The author presents an extensive review of the early literature relating to artificial sources of light. The difficulties of the subject are set forth and the directions in which the most practical development is to be anticipated are indicated.—*B. M. Duggar.*

TOXIC AGENTS

188. Allard, H. A. **Effects of various salts, acids, germicides, etc., upon the infectivity of the virus causing the mosaic disease of tobacco.** Jour. Agric. Res. 13: 619–637. 1918.—The author gives the results of extensive experiments along the line indicated. Formaldehyde and strong alcohol were found to destroy the infective principle quickly, alcohol of 30–50 per cent was destructive only after an interval of some days, while many other substances affected the "virus" to a less degree or not at all. [See Bot. Absts. 1, Entry 1004.]—*R. A. McGinty.*

MISCELLANEOUS

189. Bock, Joseph C., and Standley R. Benedict. **A new form of colorimeter.** Jour. Biol. Chem. 35: 227–230. *Fig. 1–3.* 1918.

190. Cullen, Glenn E., and J. Harold Austin. **Hydrogen ion concentrations of various indicator end-points in dilute sodium hypochlorite solutions.** Jour. Biol. Chem. 34: 553–568. *Fig. 1.* 1918.

191. HARRIS, J. ARTHUR. **Secondary parasitism in Phoradendron.** Bot. Gaz. 66: 275–276. 1918.—By the use of data (which are, however, stated to be insufficient) the author points out that the parasitism of *Phorandendron californicum* on *P. flavescens*, recently cited by Brown is just the reverse of what might be expected if successful parasitism were based upon higher osmotic concentration in the tissue fluids of the parasite.—*R. A. McGinty.*

192. HOLMES, M. G. **A study in the anatomy of hazel-wood with reference to conductivity of water.** Ann. Bot. 32: 553–567. *Fig. 1–10.* 1918.—A statistical method of investigating the constitution of wood is described from the standpoint of its efficiency for conducting water. The number, size, and distribution of the elements in the hazelwood are recorded in a graphical form. This method is intended to serve as a basis for correlating with anatomy the facts of specific conductivity obtained by experiment. In stool shoots of the hazel the figures have shown a very considerable variation in the constitution of the wood formed during the first season. On the whole there is a general decline in total conductivity and a general rise in specific conductivity from the base of the shoot to its distal end, for the wood fibers towards the base are supplied with a greater proportion of mechanical elements for support rather than water conduction. [See Bot. Absts. 1, Entry 1592.]—*S. M. Zeller.*

193. MAGROU, J. **L'immunité dans la symbiose. [Immunity and symbiosis.]** Ann. Inst. Pasteur 32: 37–47. *Pl. 1.* 1918.—The author discusses the endophytic parasitism in orchids, the occurrence in wild species of *Solanum* of a parasite of similar habits, and the conditions under which *Solanum tuberosum* may be inoculated with the fungus characteristic of wild forms. In reality cultivated species of *Solanum* have acquired a resistance to the penetration of various fungi by a tissue modification which is primarily mechanical, but this does not eliminate the specific endophyte of this host. The potato, is unable however, to tolerate long the existence of the parasitic endophyte and after penetration immunity is exhibited by the rapid degeneration of the parasite. The author considers this destruction of the parasite to be a phagocytic process. In all cases the infestation is strictly limited to superficial tissues of the young roots in regions completely differentiated and above the level of the zone of root hairs. The infestation does not extend to the tubers and to aerial parts. The author believes it possible to draw a close analogy between immunity in plants and in animals.—*B. M. Duggar.*

194. WILLIAMS, MAUD. **Absorption of gold from colloidal solutions by fungi.** Ann. Bot. 32: 531–534. 1918.—Conidia of *Penicillium glaucum* and *Oidium lactis* germinate and the mycelium develops in solutions of colloidal gold which contain tannin or gum arabic. During growth the fungi remove the metal from the solution. Retention of the gold occurs in walls which are not cuticularized. When masses of dead fungous mycelium are introduced into the solutions the process of absorption goes on more irregularly. The more diffusible solutions color the fungus more quickly than those with a lower rate of diffusion. The accumulation of gold produces a blue coloration. The process is not explained.—*S. M. Zeller.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

BRYOPHYTES

195. ANDREWS, A. LEROY. **Bryological notes, IV. A new hybrid in Physcomitrium.** Torreya 18: 52–54. 1918.—A number of species of annual Funariaceae were collected upon the silt of a reclaimed marsh at Ithaca, New York. Among them were specimens obviously hybrids between *Physcomitrella patens*, ♀, and *Physcomitrium turbinatum*, ♂. A description of the sporophyte, the only hybrid portion, is given, and a few notes upon moss hybrids in general. In footnotes a record is made of the first collection of *Physcomitrium Hookeri* east of Ohio, and of certain distinguishing features of the species *Physcomitrella patens* and *Aphanorrhegma serratum.*—*E. B. Chamberlain.*

LICHENS

196. Moxley, George L. **Additions to the lichen flora of Southern California.** Bull. Southern California Acad. Sci. 17: 61–62. 1918.—Announcement as previously unreported from Southern California of three lichens, viz., *Parmelia dubia*, *Physcia obscura* var. *virella*, and *Physcia caesia*.—*W. A. Setchell.*

ALGAE

197. Gardner, Nathaniel Lyon. **New Pacific coast marine algae II.** Univ. California Pub. Bot. 6: 429–454. *Pl. 36–37.* 1918.—The following new species of Setchell and Gardner are described and illustrated: *Chlorogloea lutea*, *Xenococcus Chaetomorphae*, *Dermocarpa hemisphaerica*, *D. pacifica*, *D. suffulta*, *D. sphaeroidea*, *Hyella Littorinae*, *H. linearis*, *H. socialis*, *Radaisia Laminariae*, *R. clavata*, *R. subimmersa*, and *R. epiphytica*. The new combination *Chlorogloea conferta* (Kuetz.) Setchell and Gardner is proposed, and a note as to the identity of *Sargassum dissectifolium* Setchell and Gardner with the previously published *S. Palmeri* Grunow is added.—*W. A. Setchell.*

198. Gardner, Nathaniel Lyon. **New Pacific coast marine algae III.** Univ. California Pub. Bot. 6: 455–486. *Pl. 38–41.* 1918.—The following new species, or new combinations, of Setchell and Gardner are described and illustrated: *Anacystis elabens* (Kuetz.), *Dermocarpa protea*, *D. sphaerica*, *Xenococcus acervatus*, *X. Cladophorae*, *X. Gilkeyae*, *X. pyriformis*, *Pleurocapsa entophysaloides*, *P. gloeocapsoides*, *Arthrospira breviarticulata*, *Phormidium hormoides*, *Lyngbya Willei*, *Symploca funicularis*, *S. aeruginosa*, *Microcoleus Weeksii*, *M. confluens*, *Calothrix rectangularis*, *C. robusta*, *Dichothrix seriata*, *D. minima*, *Rivularia mamillata*, and *Brachytrichia affinis*.—*W. A. Setchell.*

FUNGI

199. Wöltje, Wilhelm. **Unterscheidung einiger Penicillium-species nach physiologischen Merkmalen. [Separation of species of Penicillium by physiological characters.]**—Centralbl. Bakt. 48^{II}: 97–130. 1918.—The author has restudied certain species of *Penicillium* under carefully controlled cultural conditions. The literature of characterization in the genus *Penicillium* is discussed and the conclusion reached that the cultural basis for species, as proposed hitherto, has not been sufficiently standardized. As a result of careful measurement of parts, the author concludes that the morphological contrasts are too small for satisfactory separation of forms really characteristically different. He finds the color of the colony too greatly subject to variation to be reliable and to make too great demands for discrimination on the part of the worker. He, therefore, concludes that an elaborate presentation of many characters upon numerous media is necessary to establish a stable nomenclature and that these characteristics should be predominantly physiological.—For this purpose, comparative tables give the results of growth upon wort agar, wort gelatine; fluid synthetic media with nitrogen as nitrates, ammonia, and asparagin, the asparagin medium with inhibitors added such as sodium chloride, acetic acid, and lactic acid; milk, cellulose media, apples, pears, oranges, and onions. Heat tolerances are also given. The basal synthetic solution was: distilled water 100 cc., dipotassium phosphate 0.5 g., magnesium sulphate 0.25 g., cane sugar 7.5 g. The comparatively high concentration of this basal solution should be noted. Fractional sterilization was emphasized.—The named species included in the study are *Penicillium glaucum*, *P. corymbiferum*, *P. viridicatum*, *P. roqueforti*, *P. italicum*, *P. olivaceum* (*P. digitatum*), *P. purpurogenum*, and *P. luteum*. In addition 10 species are designated by Roman numerals.—The data are also collected into species characterizations which exhibit the weaknesses of the method. Each form receives a series of physiological characters each based upon results of perhaps two experiments. Wöltje finds it impossible to identify his own strains with previously described species, hence he concludes that there are a great number of undescribed species which can not be separated morphologically but for which physiological contrasts may be obtained by elaborate cultural study.—*Charles Thom.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

200. ANONYMOUS. **Varieté nouvelle d'"Aster."** **[New variety of Aster.]** Naturaliste Canadien **44**: 152–153. 1918.—The description of *Aster linariifolius* L. var. *Victorinii* Fernald is reprinted from Rhodora **14**: 194. 1914.—*Adele Lewis Grant.*

201. BUSH, B. F. **The genus Euthamia in Missouri.** Amer. Midland Nat. **5**: 157–177. 1918.—The author gives a detailed key and descriptions of the four species of *Euthamia* found in Missouri, *E. hirtella* Greene, *E. leptocephala* (*T. & G.*) *Greene*, *E. media* Greene, and *E. gymnospermoides* Greene. Two new species are described namely, *E. fastigiata*, occurring in the southeastern states, and *E. bracteata* found in the west and northwest. A number of new combinations are made.—*Adele Lewis Grant.*

202. CHURCHILL, J. R. **A smooth-fruited form of Asclepias syriaca.** Rhodora **20**: 206–207. 1918.—*Asclepias syriaca* L. forma *inermis* is described from Massachusetts.—*J. M. Greenman.*

203. CUBITT, G. E. S. **Gordonia concentricicatrix, Burkill, (Kelat samak, Samak pulut, Kelat merah—Malay).** Jour. Straits Branch Roy. Asiatic Soc., **78**: 49–50. *Pl. 3.* 1918.—Further data is recorded about this important economic species which was published recently (*ibid.* **76**: 152–153. 1917).—*Adele Lewis Grant.*

204. DAVIDSON, ANSTRUTHER. **Gnaphalium beneolens, n. sp.** Bull. Southern California Acad. Sci., **17**: 17. 1918.—A new species, *Gnaphalium beneolens*, occurring in southern California, is described and illustrated.—*Adele Lewis Grant.*

205. FARWELL, O. A. **The Trillium grandiflorum group.** Rept. Michigan Acad. Sci. **20**: 155–159. 1918.—A key to the species, varieties and forms in this group is given, and one new species, *T. Chanleri*, one new variety, and fourteen new forms are described. All of these plants occur in a small section of woodland in Farmington township, Oakland Co., Michigan. —*Adele Lewis Grant.*

206. FARWELL, O. A. **Notes on the Michigan Flora.** Rept. Michigan Acad. Sci. **20**: 161–195. 1918.—This is the first of a proposed series of papers on rare or interesting plants in Michigan. Several plants heretofore unknown to the flora of that state are recorded, new localities given and ranges extended for many others. One new species, *Polygonatum melleum*, and thirteen new varieties are described, and forty-one new combinations are listed.—*Adele Lewis Grant.*

207. FARWELL, O. A. **The yellow flowered Cypripediums.** Rept. Michigan Acad. Sci. **20**: 197–198. 1918.—The author distinguishes three distinct forms of the Yellow Ladies Slipper occurring in Michigan. *C. pubescens* Willd. var. *Makasin* (*C. Makasin*) is described as new.—*Adele Lewis Grant.*

208. FERNALD, M. L. **Some North American representatives of Braya humilis.** Rhodora **20**: 201–203. 1918.—The author presents a brief discussion of the Cruciferous plant *Braya humilis* and its immediate allies, and includes two new combinations namely, *Braya humilis* (C. A. Meyer) Robinson, var. *novae-angliae* (*Pilosella novae-angliae* Rydb.) and *Braya Richardsonii* (*Pillosella Richardsonii* Rydb.).—*J. M. Greenman.*

209. FITZGERALD, WILLIAM VINCENT. **The botany of the Kimberleys, North-west Australia.** Jour. and Proc. Roy. Soc. W. Australia **3**: 102–224. 1918.—Mr. Fitzgerald's paper deals with a part of Australia the flora of which is incompletely known. Six hundred and seventy-six species of ferns and flowering plants are recorded, including two genera, eighty-eight species, and five varieties which are described as new to science. The following is a

list of the new plants described: *Cycas furfuracea, Triglochin pterocarpa, Xerochloa imberis* R. Br. var. *repens, Eriachne pauciflora, Cyperus holoschoenus* R. Br. var. *viscida, Fimbristylis pilifera, F. oligocephala, F. arthrostyloides, Crosslandia setifolia* gen. et sp. nov. Cyperacearum, *Scirpus isdellensis, Rhynchospora affinis, Haemodorum longifolium, H. flaviflorum, Grevillea miniata, G. heteroneura, G. erythroclada, Hakea Morrisoniana, Loranthus ferruginiflorus, L. biangulatus, Ptilotus longistachyus, P. Johnstonianus, Calandrinia Tepperiana, Cassytha strigosa, Cassia neurophylla, C. cladophylla, Jacksonia petrophiloides, J. aculeata, Crotalaria membranacea, Psoralea cuneata, P. virens, Tephrosia conspicua, T. stipuligera, Atylosia lanceolata, Tribulus affinis, T. curvicarpus, Boronia pauciflora, Euphorbia distans, E. comans, E. cinerea, E. chrysochaeta, Bridelia phyllanthoides, Petalostigma humilis, Phyllanthus polycladus, Mallotus derbyensis, Buchanania oblongifolia, Cryptandra intratropica, Triumfetta reflexa, Sida Hackettiana, Abutilon Andrewsianum, A. propinquum, Hibiscus zonatus* F. v. M. var. *spinulosa, Brockmania membranacea* gen et sp. nov. Malvacearum, *Sterculia viscidula, S. tuberculata, S. viridiflora, S. decipiens, Helicteres rhynchocarpa, Nesaea repens, Terminalia Hadleyana, T. chlorocarpa, T. biangulata, T. Rogersii, Melaleuca Crosslandiana, M. argentea, M. Loguei, Fenzlia phebalioides, Diospyros nitens, Mitrasacme lepidocalyx, M. hispida, Marsdenia Brockmaniana, Ehretia urceolata, Heliotropium flaviflorum, Solanum Cunninghamii, Stemodia flaccida, Josehinia papillosa, Utricularia charnleyensis, Pityrodia obliqua, Goodenia linifolia, G. propinqua, Calogyne Heppleana, Scaevola scabrida, S. stenostachya, S. decipiens, Dampiera conospermoides, Stylidium cordifolium, S. rubriscapum, S. irriguum, S. claytonioides, Olearia aspera, Blumea pungens, B. prostrata, Pluchea tetranthera* F. v. M. var. *cinerea*, and *Pterocaulon globuliflorus*.—*J. M. Greenman.*

210. Gates, Reginald Ruggles. **A new evening primrose. Oenothera novae-scotiae.** Proc. and Trans. Nova Scotia Inst. Sci. **14**: 141–145. *2 fig.* 1918.—Gates describes and illustrates a new species of evening primrose, *Oenothera novae-scotiae*, grown from seeds collected on North Mountain, near Middleton, Nova Scotia. The type is deposited in the Herbarium of the University of California.—*J. M. Greenman.*

211. Gates, R. Ruggles. **A systematic analytical study of certain North American Convallariaceae, considered in regard to their origin through discontinuous variation.** Ann. Bot. **32**: 253–257. 1918.—This article, according to the author, is a précis of the main points of a paper to be published after the war. [See Bot. Absts. 1, Entry 478.]—*Adele Lewis Grant.*

212. Hill, Arthur W. **The genus Caltha in the southern hemisphere.** Ann. Bot. **32**: 421–435. *Fig. 1–10.* 1918.—Eleven species in the genus *Caltha* are treated in this paper, three of which are described as new. All of these belong to the section *Psychrophila*, based primarily on the development of the auricles of the leaf laminae forming upturned or erect appendages. These appendages are figured for most of the species. Of the new species described, *C. alata* and *C. involuta* are from South America and *C. phylloptera* is from Tasmania.—*Adele Lewis Grant.*

213. Koidzumi, Geniti. **Contributiones ad floram Asiae Orientalis** [Contributions to a flora of eastern Asia]. Bot. Mag. Tôkyô **32**: 53–63, 134–138. 1918.—This is a continuation from Vol. **31**: 262 of the same publication. The following new species and new varieties are described, all of which occur in Japan: *Myoporum boninense, Carex siroumensis, C. tenuiseta* Fr. var. *brevisquama, C. yesoensis, C. boninensis, Callicarpa glabra, C. Nishimurae, Prunus chikusiensis, Oxycoccoides japonicus* Nakai γ *ovatus, O. japonicus* δ *serrulatus, Artemesia glomerata* Ledeb. var. *pedunculosa, Phyllodoce caerulea* Bab. var. *yesoensis, P. alpina, Achillea pulchra, Rosa adenochaeta, Rubus Grayanus* Maxim. var. *chaetophorus, Hypericum ovalifolium, Salix pauciflora, S. kurilensis, Poa misera* Koidz. var. *alpina, Oxytropis japonica* Maxim. var. *sericea, Artemisia norvegica* Fries. var. *villosa, Arundinella anomala* Steud. var. *glauca, Stachyurus macrocarpus, S. lancifolius, Psychotria serpens* L. var. *macrophylla, Fatsia oligocarpella, Microstylis boninensis, Hydrangea Kowagoeana*, and *Juniperus lutchuensis*. *Eriophorum Scheuchzeri* Hoppe, *Gentiana glauca* Pall., and *Sparganium submuticum* Neum. are listed as being new to the flora of Japan.—*Adele Lewis Grant.*

214. Lunell, J. **Enumerantur plantae Dakotae Septentrionalis vasculares.—XIV. [Enumeration of the vascular plants of North Dakota.].** Amer. Midland Nat. **5**: 233–241. 1918. —The present article consists of a continuation of the appendix to a series of papers published under the above title. Descriptions are given of two new species and four new varieties from North Dakota namely, *Amelanchier leptodendron*, *Scrophularia dakotana*, *Peritoma serrulatum* var. *clavatum*, *Laciniaria scariosa* var. *inconcinna*, *Arnica pedunculata* var. *monocephala* (*A. monocephala* Rydb.), and *Senecio canus* var. *eradiatus*.—*J. M. Greenman.*

215. Millspaugh, C. F., and Earl E. Sherff. **New species of Xanthium and Solidago.** Field Mus. Nat. Hist. Bot. Ser. **4**: 1–7. *Pl. 1–6.* 1918.—*Xanthium leptocarpum*, *X. arcuatum*, *X. cylindricum*, *X. crassifolium*, *X. acutilobum*, and *Solidago emarginata* are described as new. —*J. M. Greenman.*

216. Miyabe, Kingo, and Yushun Kudo. **Materials for a flora of Hokkaido. VIII.** Trans. Sapporo Nat. Hist. Soc. **7**: 23–35. 1918.—The present article on the flora of Hokkaido contains many notes on the distribution of plants beyond the limited area referred to by the title. Several plants are listed as being new to Hokkaido and the following new species and new forms are described: *Dryopteris okushirensis*, *Carex flaccidior* (*C. eleusinoides* var. *flaccidior* Fr. Schm.), *Ranunculus trichophyllus* Chaix, forma *nemorensis*, *R. trichophyllus* Chaix, forma *kushirensis*.—*Adele Lewis Grant.*

217. Nakai, Takenoshin. **Notulae ad plantas Japoniae et Koreae XVI, XVII.** [Notes on the plants of Japan and Korea. XVI, XVII.] Bot. Mag. Tôkyô **32**: 28–37, 103, 110. 1918.— The sixteenth and seventeenth numbers of this series of articles on the plants of Japan and Korea contain descriptions of eighteen new species and two new varieties. Unless otherwise noted, all the descriptions are written by Nakai. The new plants ascribed to Korea are *Saxifraga Furumii*, *Fagus multinervis*, *Abelia coreana*, *Aster Oharai*, *Alsine macrocarpa* Fenzl. var. *koreana*, and *Salix hallaisanensis* Léveillé var. *longifolia*. The rest occur in Japan, and are as follows: *Pyrus aromatica* Kikuchi & Nakai, *P. hondoensis* Nakai & Kikuchi, *Corydalis filistipes*, *Opulaster insularis*, *Cotoneaster Wilsonii*, *Rubus takesimensis*, *Prunus takesimensis*, *Phellodendron insulare*, *Acer takesimense*, *Viola insularis*, *Abelia insularis*, *Chrysanthemum lucidum*, *Pyrus crassipes* Kikuchi & Nakai, and *Osmunthus rigidus*. The last two are cultivated in Japan but their origin is unknown.—*Adele Lewis Grant.*

218. Nakai, Takenoshin. **Praecursores ad floram sylvaticam Koreanam. X.** [A basis for a ligneus flora of Korea]. Bot. Mag. Tôkyô **32**: 113–133. 1918.—The present number of this series of articles on the woody flora of Korea discusses *Oleaceae*. Keys to the genera and species occurring in Korea are given and the following new species, new varieties, and new combinations are included: *Ligustrum foliosum*, *L. salicinum* (*L. ciliatum* var. *salicinum* Nakai), *Syringa dilatata*, *S. micrantha*, *S. Kamibayashii*, *S. venosa* from Korea, and *S. buxifolia* occurring in China.—*Adele Lewis Grant.*

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ENTRIES 219-37[illegible]

BOTANICAL ABSTRACTS

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NOTE

Unavoidable delays have thus far prevented the publication of Botanical Abstracts at proper monthly intervals. It is hoped that regular monthly publication on the calendar schedule will soon become possible.

Some changes in the subdivision of the field, and corresponding changes in editors and sections, have been made, but will not apply until later.

Some improvements in the style of Botanical Abstracts are being made from time to time as the issues appear. The Editorial Board will be glad to receive suggestions as to possible improvements and such suggestions may be addressed to the Editor-in-Chief or to any Editor.

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ENTRIES 219-370

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

219. BATTEN, LILY. **Observations on the ecology of Epilobium hirsutum.** Jour. Ecol. 6: 161-177. *55 fig.* Nov., 1918.—Plants of *Epilobium hirsutum* proved themselves capable of responding to external stimuli in the development, early in spring, of a phellogen layer capable of producing cork, concentric layers of aerenchyma, non-concentric aerenchyma, or alternate layers of phelloid and non-phelloid cells. The nature of the response was found to depend directly upon the environment of the plant and the position of the organ concerned, the rhizome showing most plasticity. Plants from dry habitats where they had no aerenchymatous tissue when transferred to water or mud showed in one vegetative season the development of aerenchyma on all rhizoids in mud or water. A transfer from wet to dry habitats showed less complete response and "produced concentric layers of aerenchyma in the part of the shoot below the soil level, although its formation was no longer essential to the life of the plant."

Seeds from water-grown plants with aerenchymatous tissue produced seedlings which in dry habitats showed no trace of aerenchyma. It was shown also that the seeds would germinate either in moist soil or below water level but that the latter gave weak seedlings, the best results coming from a generous supply of moisture without submergence.—*Geo. D. Fuller.*

220. COCKAYNE, L. **The importance of plant ecology with regard to agriculture.** New Zealand Jour. Sci. Technol. 1918: 70-74. 1918.—The author emphasizes the importance of an intensive study of the plant communities that concern the farmer, citing as an example the tussock grassland, the most extensive of New Zealand pastures. The relation of this plant association to the various factors of its environment, its distribution and its variability are as yet little known and yet such knowledge is most essential to its better management and its higher productivity. Burning has been practiced in order that it may give better results in grazing, although it has not been shown what are the permanent effects upon the duration of the grasses. Even the racial purity of the principal grass, *Poa Colensoi* is not established, in fact, there is evidence that there is included under this name a complex of races differing much in value to the sheep farmer.—The control of the sand dune area is mentioned as another problem essentially ecological in nature but of great economic importance to the farming community. The final point is that nothing is more urgently needed in the interests of New Zealand agriculture than an agricultural survey, conducted along ecological lines, of all lands with a view to their accurate classification for various lines of agricultural development.—*Geo. D. Fuller.*

221. Coker, R. E. **Principles and problems of fish culture in ponds.** Scientific Monthly 7: 120–129, *2 fig.* Aug., 1918.—This paper is of much interest to plant ecologists, for it appears that pisciculture is in large part applied plant ecology. Plants are the chief oxygenators in confined ponds, but as yet little is known as to the value of one species over another in oxygenation, except that submerged evergreens with finely divided leaves are probably most satisfactory. While it is known that plants directly or indirectly are the basis of fish food, we are just beginning to determine which species have the greater food values. The problem of the optimum association of species in a pond is also of the greatest importance.—*H. C. Cowles.*

222. Emig, W. H. **Mosses as rock builders.** Bryologist 21: 25–27. *Pl. 15.* 1918.—Mosses, particularly *Didymodon tophaceus* and *Philonotis calcarea*, have played an important part in the development of the travertine deposits in the Arbuckle Mountains, Oklahoma. The travertine is deposited along streams, principally in connection with water-falls. It is formed by the accumulation on mosses and other water plants of calcium carbonate, which is said to be precipitated from aqueous solution mainly as a result of the diffusion into the air of carbonic acid gas from evaporating water surfaces. The mosses act only indirectly in the precipitation, principally by supplying a larger absorptive and adsorptive surface for the evaporation of the calcareous solution.—*G. E. Nichols.*

223. Fernald, M. L. **The geographic affinities of the vascular floras of New England, the Maritime Provinces and Newfoundland.** Amer. Jour. Bot. 5: 219–247. *3 pl.* May, 1918.—The region in question, with an area of about 200,000 square miles, possesses an indigenous vascular flora of more than 2800 species and varieties, practically all of which are post-glacial immigrants. Knowledge concerning this flora is not yet sufficiently complete to permit accurate deductions regarding its geographic origin, but the known affinities of certain elements with floras of other regions suggest many problems. In discussing these affinities, emphasis is laid on species of discontinuous range; it is to these, rather than to widely distributed species of nearly continuous distribution over large areas, that the greatest phytogeographical interest attaches. Considering the flora of this region in relation to floras in other parts of North America, attention is called to the coastal plain element, the Mississippi basin element, the western prairie-plains element, and the western subsaline element (temperate American affinities), and to the circumpolar, Greenland-Laborador, and several northwestern elements (boreal affinities). Considering the flora here in relation to floras outside of North America, attention is directed to several distinct Asian, Eurasian, and European affinities, and to affinities with the floras of South America, Polynesia, Australia, and even Africa. A number of illustrative observations are introduced to show the need of further investigations, both extensive and intensive, within the region under discussion.—*G. E. Nichols.*

224. Karsten, G. **Uber Kompasspflanzen.** [On compass plants.] Flora 111-112: 48–59. *3 pl.* 1918.—Author tested by means of a thermoelectric couple the temperature of leaves of *Lactuca scariola* in different positions, finding that vertical leaves perpendicular to the rays of the sun were 7.6° warmer than those parallel to the rays, that horizontal leaves were 3.6° warmer than vertical ones, that leaves twisted from the parallel to the perpendicular position showed an immediate rise in temperature of 4.2° to 6.3°, and that vertical leaves in meridional position showed a marked cooling in the middle of the day, followed by an equally marked increase in temperature as the sun moved into the west in the afternoon. On estimating the transpiration by loss in total weight of small potted plants, he found that transpiration was greater during the afternoon hours. He concludes that the plant is a typical sun-loving species, adapted to utilize the direct rays of the sun, while plants with horizontal leaves are adapted primarily to diffuse light. Various species of *Opuntia* in a glasshouse with light only from the south tended to develop their new growth also in a meridional position. Author states that in low latitudes with consequently high altitude of the sun any vertical position is sufficient to secure direct illumination during the major portion of the day, while in higher

latitudes with lower altitude of the sun a meridional position is necessary. He calls attention to the fact that plants with vertical leaves are relatively common in tropical and subtropical climates, while true compass plants are to be expected only in more northern latitudes.—*H. A. Gleason.*

225. NEWMAN, L. F., AND R. W. NEWMAN. **Some records of the seasonal flora of arable land under cultivation.** Jour. Ecol. 6: 178–188. Nov., 1918.—Records throughout the entire summer upon variously tilled fields showed that although the flora was limited to a comparatively small number of species it showed decided and interesting fluctuations. Certain species would suddenly appear in large numbers on a particular field for reasons that could not be explained while there were also equally sudden and inexplicable disappearances. The causes of these phenomena are recognized to be of both economic and ecological importance. The complete disappearance of dead plants is also mentioned as one of the surprises of the investigation and while worms and fungi are among the probable agents, more extensive investigations in the near future are promised.—*Geo. D. Fuller.*

226. SAMPSON, ARTHUR W. **Climate and plant growth in certain vegetative associations.** U. S. Dept. Agric. Bull. 700. *72 p., 37 fig.* Oct., 1918.—A study of the growth and transpiration of *Pisum arvense, Triticum durum,* and *Bromus marginatus,* on the Wasatch Mts. in central Utah. Three stations were located in the Oak-brush (7,100 ft. alt.), the Aspen-fir (8,700 ft. alt.), and the Spruce-fir (10,000 ft. alt.) associations, open spaces being chosen for experimental purposes. In addition to the potometer transpiration measurements, wind velocity, air temperature, precipitation, evaporation, and barometric pressure were also measured and compared with plant growth and the water requirement. Temperatures and temperature summations were greatest in the Oak-brush type and decreased with altitude. Evaporation from the porous cup was most rapid in the Oak-brush and Spruce-fir, the former being due to high temperature and the latter to higher wind velocity. The water requirement was greater in each case in the Oak-brush type, as was also the temperature and evaporation and the sunlight measured by differential evaporation. While the total dry matter produced and the average leaf length were greatest in the Aspen-fir, the period of growth from seed time to flowering was shortest in the oak-brush and increased with altitude. Temperature summation for this period were nearly the same for each of the stations.—*H. L. Shantz.*

227. SAMPSON, ARTHUR W. **Effect of grazing upon aspen reproduction.** U. S. Agric. Bull. 741. *29 p., 5 pl., 7 fig.* Feb., 1919.—These studies were made at Manti National Forest in Utah and cover a period of five years. On lands bearing a stand of aspen (*Populus aurea* Tidest) it is advisable to maintain a proper balance between grazing and timber reproduction, both because of the value of the timber and the water-shed protection afforded. Aspen is often reproduced with difficulty where the lands were made to serve the double purpose of timber and meat production.

The leafage, young twigs, and branches are browsed by both cattle and sheep. Over 90 per cent of the damage inflicted by stock is chargeable to browsing. Sheep are responsible for severe damage, but the extent of injury by cattle is usually slight except where the lands are overgrazed. Injury by sheep amounted to the death of over one-half of the new growth in heavily grazed areas, and about one-third in lightly and medium grazed areas.

On clean-cut lands, the annual mortality due to sheep grazing is exceedingly heavy. Three years grazing results in the destruction of the entire stand. On lands protected from grazing aspen sprouts are produced during the first two seasons after cutting. On grazed lands a considerable number of sprouts are sent up for three successive seasons.

A surprisingly large proportion of the new growth, even on the most favorable sites is killed during the first three years. Frost, and bark-eating mammals notably gophers, field mice, and rabbits, are mainly responsible for such mortality. Sprouts averaging 45 inches in height are found to be exempt from destructive browsing by sheep. In the case of cattle there is some damage to sprouts between 55 and 60 inches in height, but seldom to those of any greater height. The annual rate of height increment of the aspen production averages

about 15 inches. Hence sprouts three years of age are exempt from serious injury by sheep and those from four to five years of age are free from serious injury by cattle. Aspen is seldom able to reproduce under its own shade. [See Bot. Absts. 2, Entry 19.]—*H. L. Shantz.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

228. LIN, D. Y. **Deforestation and floods in northern China.** Jour. Forestry 16: 888–896. Dec., 1918.—Excerpts are given from engineers that the Chinese floods could be mitigated by the establishment of forests at the headquarters of the river systems with engineering works as aids. Five big waterways of China have a drainage area of 75,000 square miles, 60,000 of which are mountainous, discharging finally in one river which in 1917 rendered 5,611,759 people homeless, 17,646 villages more or less inundated, and flooded an area of 15,000 square miles. The effect of forests on stream flow, erosion and flood is discussed in general terms.—*E. N. Munns.*

229. PICKERING, SPENCER U. **Effect of one plant on another.** Ann. Bot. 31: 181–187. April, 1917.—Experiments were conducted to secure definite data on the production of toxin by growing plants. The experiment consisted of three flower pots with growing mustard plants and a perforated tray arranged to fit over them containing five inches of earth and with an aperture in the center for the plants to protrude through. All the water the plants needed percolated through these trays except in No. 2. Tray No. 3 contained earth without any plants. The perforations in the bottom of Tray No. 2 were blocked so that no water could reach the growing plants. Tray No. 1 also contained a crop of growing mustard plants and the perforations in the bottom were left open so that the washings could pass through them to the plants in the flower pot beneath. In the case of the growth of mustard in flower pots Nos. 2 and 3 there was practically no difference but in No. 1 where the washings from the mustard above had free access the growth was reduced to one-hundredth of their normal size. The conclusion would seem obvious that the leachings from the plants growing in the trays must contain something which is toxic to other plant growth. The author states that by means of pot experiments the following plants have been found susceptible to such influence: apples, pears, plums, cherries, six kinds of forest trees, mustard, tobacco, tomatoes, barley, clover, and two varieties of grasses; whilst the plants exercising this baneful influence have been apple seedlings, mustard, tobacco, tomatoes, two varieties of clover and sixteen varieties of grasses. In no case have negative results been obtained. The extent of the effect varies very greatly; in pot experiments the maximum reduction in growth of the plants affected has been 97 per cent, the minimum 6 per cent, whilst in field experiments with trees, the effect may vary from a small quantity up to that sufficient to cause the death of the tree. The average effect in pot experiments may be roughly placed at a reduction of one-half to two-thirds of the normal growth of the plant, but no sufficient evidence has yet been obtained to justify the conclusion that any particular kinds of plants are more susceptible than others, or that any particular surface crop is more toxic than another; that such differences exist is highly probable but all the variations observed so far may be explained by the greater or lesser vigor of the plants in the particular experiments in question. Similarly, as regards the effect of grass on fruit trees, though the extent of it varies very greatly, and in many soils is certainly small, we must hesitate to attribute this to any specific properties of the soils in question; for when soils from different localities (including those from places where the grass-effect is small) have been examined in pot experiments, they have all given very similar results; and this applies equally to cases where pure sand, with the addition of artificial nutrients, has been taken as the medium of growth.

It is stated that the various possibilities which suggested themselves in explanation of this effect, were excluded one by one until the only possibility left is the formation of some toxic substance. The following are some of the factors which were eliminated:—protection and moisture; alterations in temperature; alkalinity or physical condition of the soil; altera-

tions in its carbon dioxide; and bacterial contents.—The remainder of the article is devoted to showing how these factors among others will eliminate the suggested possibilities. The method of demonstrating how the effect produced is not explained by insufficient food supply is shown as follows:

When a stronger and weaker plant, or an older and younger one, are growing side by side, we find that the latter rarely picks up, and generally gets more and more behind its stronger brother. This cannot be due to the stronger one monopolizing the food supply; for if it exhausted this supply, both plants would suffer at the same time, and, till that supply is exhausted, both would flourish equally. The inadequacy of any such explanation is demonstrated by taking a pot of soil capable of growing, say, six plants, sowing the seed for three of them first, and that for the other three a certain number of days later. In the case of mustard, when the difference of date is only four days, it is found that, at the end of growth, some two or three months later, the last sown plants are 60 to 70 per cent smaller than the others. It is evident that three four-day-old seedlings could not have exhausted the nourishment in 7.5 kilos of rich soil so far as to leave insufficient food for three other seedlings; nor can a difference in age of four days in a total life of several months account for such a difference in the weights of the plants. But the results become clear if we take into account the toxic effect of one plant on the other, for the later planted individuals have to start growth under toxic conditions which were absent in the case of those first planted, and throughout their existence their inferiority in size will make them suffer more than their stronger brethren, though the actual amount of toxin in the soil is the same for all.—In working on the factor of root influence it is stated that when a number of plants are grown together in one pot or in one plot in the field, and when the crowding attains to a certain magnitude, the limiting factor is the amount of soil available for each plant, the result of which is that the weights of the plants are inversely proportional to the bulk of the soil available (the soil area) or in other words the total plant growth is the same whatever be the number of plants.—*E. R. Hodson.*

230. Secrest, Edmund. **War time uses of timber.** Monthly Bull. Ohio Agric. Exp. Sta. 3: 321–327. Nov., 1918. [Whole no. 35.]—Black walnut for gunstocks and airplanes was in great demand and coöperative methods of handling the sales to make car-load shipments are described. Small trees and shade trees were not needed. White ash for airplanes and handles was greatly needed and the care necessary in getting this material without waste is shown. Oaks were used for artillery, motor truck, and ship-building purposes, and the locust for treenails. Care of young growth and the plantation of additional trees are urged. —*E. R. Hodson.*

231. Secrest, Edmund. **Meeting the wood fuel situation.** Monthly Bull. Ohio Agric. Exp. Sta., 3: 291–299. Oct. 10, 1918. [Whole no. 34.]—Information is given on the value of local species for fuel, and the weights of the woods and their equivalents in coal. Information as to machinery, costs, and methods of preparing wood fuel is presented in a popular manner.—*E. R. Hodson.*

GENETICS

George H. Shull, *Editor*

232. Anonymous. **Wanted, photographs of twins.** Jour. Heredity 9: 262. Oct., 1918.—American Genetic Association of Washington, D. C., asks that photographs of twins be sent to its address. Pictures at different ages are especially desired in order to determine degree of resemblance and its persistence through life. Any additional information such as address of known twins who might be willing to coöperate with the Association, is called for. Special interest is shown in difference between identical and fraternal twins.—*H. H. Laughlin.*

233. Babcock, E. B., and R. E. Clausen. **Genetics in relation to agriculture.** *15 × 23 cm., xx + 675 p., 239 fig., 4 colored pl.* McGraw-Hill Book Co.: New York, 1918.—Review by Spillman, W. J. Jour. Heredity 9: 361. Dec., 1918. [See also Bot. Absts. 1, Entries 210, 220, 244.]

234. Barker, E. Eugene, and R. H. Cohen. **Variability in the radish.** Jour. Heredity 9: 357-361, 384. *Fig. 10.* Dec., 1918.

235. Boveri, Theodor. **Zwei Fehlerquellen bei Merogonieversuchen und die Entwicklungsfähigkeit merogonischer und partiellmerogonischer Seeigelbastarde. [Two sources of error in investigations of merogony and the ability of merogonic and partially merogonic seaurchon hybrids to develop.]** Arch. Entwicklungsmech. d. Organ. 44: 417-471. *3 pl.* 1918.

236. Bridges, C. B. **Duplication.** Anat. Rec. 15: 357-358. Jan. 20, 1919.—Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918: "In *Drosophila melanogaster* several cases of abnormal inheritance are accounted for by the assumption that in each case a piece of chromosome has been taken from its normal position and joined to another chromosome.—In the first of these cases a section of the X-chromosome, including the loci for vermilion and sable, became detached from its normal location in the middle of the X-chromosome and became joined onto the 'zero' end (spindle fiber) of its mate. For certain loci this latter chromosome carries two sets of genes—those present in the normal location and also the duplicating set. If a male carries the recessive genes for vermilion and for sable in the normal loci and the wild type allelomorphs in the duplicating loci, he is wild-type in appearance precisely as though he were an XX female heterozygous for vermilion and sable. A female having one such chromosome and a normal chromosome carrying the vermilion and sable genes is triploid for these loci. It has thus been proved that [two] recessive genes may dominate one dominant. A female tetraploid for these loci can be made, and by this means it was shown that two recessives are recessive to two dominants. Criss-cross inheritance of the Abraxas type can be initiated in Drosophila by crossing one of the above wild-type females to a vermilion sable [male], for the daughters are vermilion sable and the sons wild-type.—In another case of duplication the duplication piece contains only the locus for sable as far as known. In both of these cases the duplicating piece is joined on at the zero end (spindle-fiber), and experiments can be made in which the linkage of vermilion and sable will indicate a locus at zero instead of at 33 and 43, respectively.—A third case is the transposition of a piece of the second chromosome to the middle (spindle fiber) of the third chromosome. The genes of this duplication piece show linkage to both the second and the third chromosome at the same time. In this third case both the duplicating fragments attached to the III chromosome and the II chromosome that suffered deficiency are on hand. Any gamete that receives this deficient II chromosome dies unless at the same time it receives the third chromosome carrying the missing piece.—The most significant bearing of these cases is upon the idea of evolution of chromosome groups."—*Geo. H. Shull.*

237. Detlefsen, J. A. **Fluctuations of sampling in a Mendelian population.** Genetics 3: 599-607. Nov., 1918.—Author obtained large number of mice from backcross involving three pairs of Mendelian factors. Ratios in population as a whole were found to agree well with Mendelian expectation, as brought out in another paper. In present paper, it is shown that the distribution of colors within the litters is also in close accord with laws of chance. Pearson's test for goodness of fit is used throughout.—*Sewall Wright.*

238. Detlefsen, J. A., and E. Roberts. **On a back cross in mice involving three allelomorphic pairs of characters.** Genetics 3: 573-598. Nov., 1918.—Authors tested mathematically the conformity of results with Mendelian expectations in a trihybrid cross. Wild gray and pink-eyed brown mice, which are believed to differ in respect to three factors, were mated, and resulting hybrids were back-crossed to triple recessive form (pink-eyed brown). In statistical treatment, each monohybrid ratio was first dealt with separately; then each dihybrid combination; finally the trihybrid combinations. These determinations were based upon some 4500 individuals.

Monohybrid ratios were in every case reasonably close to expectation, with no evidence of selective mortality prior to birth. After birth, however, there was selective elimination of non-agouti individuals as compared with agouti.

With one possible exception, recombinations among the three pairs of allelomorphs was purely haphazard, there being no linkage. This exception was a slight apparent tendency toward "repulsion" (i.e., excess of recombinations over parental combinations), when the factors agouti and dark-eye and their allelomorphs are considered. This "suggests slightly different frequencies in the various kinds of maturation divisions."—*F. B. Sumner.*

239. DOWNEY, JUNE E. **Standardized tests and mental inheritance.** Jour. Heredity 9: 311–314. *Fig. 7.* Nov., 1918.—Statement of problem of determining special aptitude in children at early age. Goddard's work in utilizing Binet scale in intelligence as basis of Mendelian studies is mentioned. Need for additional tests for super-normal children is set forth. Five children are described giving results of specific tests for each case.—*H. H. Laughlin.*

240. GATES, WILLIAM H. **Another hen that crowed.** Jour. Heredity 9: 343–347. *6 fig.* Dec., 1918.—See Bot. Absts. 2, Entry 670.

241. GLASER, O. C. **Inheritance of absence of the sense of smell.** Jour. Heredity 9: 347. Dec., 1918.

242. GOODALE, H. D. **Winter cycle of egg production in the Rhode Island Red breed of the domestic fowl.** Jour. Agric. Res. 12: 547–574. 1918.—A study of individual egg-records of Rhode Island Red hens associated with a study of length and seasonal distribution of pauses in production, conducted to classify individual hens with reference to their winter cycle. Author reports (1) examination of data published by Gowell confirms statements of Pearl and Surface regarding presence of winter cycle in Barred Plymouth Rock hens; (2) winter cycle is much more characteristic of the Maine flocks than of author's Rhode Island Reds, in which the cycle can be demonstrated in portion of flock only; (3) period of decreased flock-production for Barred Plymouth Rocks and White Wyandottes comes in February, while for Rhode Island Reds it may come in January or February; (4) A pause, or series of pauses, usually exceeding 10 days in length and following a considerable period of egg-production, is best index of existence of winter cycle in the individual Rhode Island Red hen; (5) rate of production does not furnish satisfactory index of presence or absence of winter cycle; (6) evidence is presented which indicates winter cycle may be inherited in some definite but unascertained manner. [Abst. in Exp. Sta. Rec. 38: 876. Aug. 9, 1918.]—*Philip Hadley.*

243. GOODSPEED, T. H., AND R. E. CLAUSEN. **An apparatus for flower measurement.** Univ. California Publ. Bot. 5: 435–437. *Pl. 64, fig. 1.* 1918.—Authors give constructional diagrams and methods of use of instrument to expedite linear measurements in biometrical work, especially with flowers.—*J. P. Kelly.*

244. HEAL, JOHN. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 25–26. *Fig. 9.* Jan. 18, 1919.—See Bot. Absts. 2, Entry 675.

245. HEGNER, R. W. **Variation and heredity during the vegetative reproduction of Arcella dentata.** Proc. National Acad. Sci. U. S. Amer. 4: 283–288. Sept. 1918.

246. HEGNER, R. W. **Quantitative relations between chromatin and cytoplasm in the genus Arcella, with their relations to external characters.** Proc. National Acad. Sci. U. S. Amer. 5: 19–22. Jan., 1919.—Studies of nucleo-cytoplasmic and of chromatin-cytoplasmic relations in two species of *Arcella.* Nucleus is of type with chromatin in spherical mass at center. *Arcella dentata* has two nuclei per cell; an individual cut in two gave origin to uninucleated progeny that averaged smaller than normal; bi-nucleated condition was later resumed and with it diameter which was characteristic before experimentation. In *A. polypora* cells of clone 5 had 3 to 7 nuclei; showed marked correlation between diameter of cell and number of nuclei; cells of clone 34 had 5 to 10 nuclei with cell diameter less than those of cells with less number of nuclei in clone 5; quantity of chromatin, however, in specimens of same size in two clones was same regardless of nuclear number. In *A. dentata* diameter of

shell and spine number are correlated with chromatin mass. Author suggests that results of selection in *Difflugia* and *Centropyxis* may have been due to change in quantity of chromatin rather than in quality.—*J. P. Kelly.*

247. IRELAND, ALLEYNE. **Democracy and the accepted facts of heredity. A biological view of the Government.** Jour. Heredity 9: 339–342. Dec., 1918.

248. KIESSLING, L. **Einige besondere Fälle von chlorophylldefekten Gersten. [Several special cases of barley defective in chlorophyll.]** Zeitschr. indukt. Abstamm. Vererb. 19: 160–176. June, 1918.

249. LATHROP, A. E. C., AND L. LOEB. **Further investigations on the origin of tumours in mice. V. The tumour rate in hybrid strains.** Jour. Exp. Med. 28: 475–500. 1918.—"In selecting for hybridization various groups of mice representing a low tumour strain and other groups representing a high tumour strain, there were obtained in the majority of cases hybrid strains with a tumour rate intermediate between that of the parent strains. There does not appear to be a fixed rule as to dominance in the tumour rate. The results of this investigation confirm the authors' previous conclusion that, in the majority of crosses which are observed, the cancer rate is either intermediate between those of the father and mother strain, or that it follows the tumour rate of the parent with the higher rate, and only in a relatively small number of instances the cancer rate follows that of the parent strain with the lower tumour rate." [Abstract from Physiol. Absts. 3: 538. Jan., 1919.]—*J. C. D[rummond].*

250. LIPPINCOTT, W. A. **Pedigreeing poultry.** Kansas Agric. Exp. Sta. Circ. 67: *16 p., 10 fig.* 1918.

251. LOTSY, J. P. **Proeven en beschouwingen over evolutie. [Experiments and speculations concerning evolution.]** Genetica 1: 3–7. Jan., 1919.

252. LOTSY, J. P., H. N. KOOIMAN, AND M. A. J. GOEDEWAAGEN. **Proeven en beschouwingen over evolutie. I. De Oenotheren als kernchimeren. [Experiments and speculations concerning evolution. The Oenotheras as nuclear chimeras.]** Genetica 1: 7–69. Jan., 1919.

253. LOTSY, J. P. **Over de mogelijkheid van intranucleaire kruising bij homozygoten. [On the possibility of intranuclear crossing in homozygotes.]** Genetica 1: 92–97. Jan., 1919.

254. LUMSDEN, D. **Orchid breeding.** Jour. International Gard. Club 2: 203–212. *5 fig.* 1918.

255. MCEWEN, R. S. **The reactions to light and to gravity in Drosophila and its mutants.** Jour. Exp. Zool. 25: 49–106. *3 fig.* 1918.—A mutant stock of *Drosophila melanogaster* called tan is characterized by loss of positive heliotropism shown by wild flies. This character is recessive and sex-linked; tan mother by wild male gives daughters that are positively heliotropic and sons that are indifferent. When wings of wild fly are cut off at base, fly loses its positive reaction. Mutant races with short wings are less strongly positive. Mutant races with different eye colors react differently to light of different colors.—*T. H. Morgan.*

256. MIDDLETON, AUSTIN RALPH. **Heritable effects of temperature differences on the fission rate of Stylonychia pustulata.** Genetics 3: 534–572. *5 fig.* Nov., 1918.—Problem is "how living systems may become modified so that the modifications remain in later generations, even after the modifying factors are removed." Infusorian, *Stylonychia pustulata*, multiplying by fission, was subjected to diversities of temperature for various periods. Three series of experiments were carried out. (1) Sixty lines belonging to one clone were kept at 30°–32°C. and sixty at 18°–20°C. Diversities in fission rate occurred; that of specimens kept at higher temperature was 33.47 per cent greater for a 20-day period. Similar difference in fission rate persisted for 16 days after the two groups were brought into room temperature, but was lost 31 days later. (2) Lines derived from single specimen were kept at 28°–30°C.

and 6°–9°C. respectively, and samples tested at high, intermediate, and low temperatures at intervals of 20, 40, 60, 120, and 170 days. At 20 days, high line divided more rapidly; at 40 days or more, high line divided more slowly; and at end of 6 months, high line died out but low line was as viable as at first. (3) Samples of lines kept at diverse temperatures for 30 days showed at high temperature a higher fission rate for the high line; at intermediate temperature higher fission rate for low line; and at low temperature, first higher fission rate for low, but later for high line.—*R. W. Hegner.*

257. MULLER, H. J. **Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors.** Genetics 3: 422–499. *1 fig.* Sept., 1918.—Analysis of beaded wing race of *Drosophila melanogaster*. By means of ingenious and precise methods, author has obtained solution of this case, which had been the most difficult one in Drosophila. Beaded gene lies in third chromosome; and is dominant in its effect on wings but has recessive lethal effect as in yellow mouse case. Unlike latter case beaded stock bred true in its later history. Author shows that this is due to existence of a lethal mutation in the not-beaded third chromosome of the stock. Stock is thus permanently heterozygous, since the homozygous beadeds and the homozygous lethals all die. Case is also complicated by presence of gene that decreases crossing over in this region, thus making heterozygous condition more stable. Permanently heterozygous condition, due to such "balanced lethals," makes possible many curious results. Author has obtained twin hybrids of same type as those occurring in Oenothera. He shows that known recessive mutants may be introduced into such stocks, and may remain concealed even while the stock is bred without selection. Occasional crossovers will cause these recessives to appear in small numbers, thus simulating recurrent mutations. "Mutations" of this type may be prearranged to appear with almost any desired frequency. Judging by frequency of occurrence of lethal mutations in *Drosophila*, it seems likely that balanced lethal condition may arise not infrequently. Conclusion is drawn that unusual genetic behavior of *Oenothera*, including large proportion of its "mutations," is due to a complicated case of balanced lethals.—*A. H. Sturtevant.*

258. NIEUWLAND, J. A. **Teratological notes.** Amer. Midland Nat. 5: 231. 1918.—Abnormal form of *Onoclea sensibilis* has been found, in which a vegetative frond had changed to sporophyll. Albino plants of *Lobelia syphilitica* and white-flowered specimens of common harebell were collected along shores of Lake Michigan in northern Indiana.—*J. H. Kempton.*

259. POPENOE, PAUL. **Will morality disappear?** Jour. Heredity 9: 269–270. Oct., 1918.—Frederick Adams Woods is quoted as authority for statement that morality of members of European royal families, who are parents, is definitely correlated with number of their children who reach age of twenty-one years. Lowest grade of morality had 1.66 children each, the highest had 3.83. Royalty is suggested as good working material because of artificial incentive for all members of royal families to have many children.—J. McKeen Cattell is quoted to effect that the two-children family is practically standard among American men of science. A. H. Estabrook's Juke studies show that there were 4.3 children to each fertile degenerate woman. In solution of the problem it is suggested that the sociologist and economist rather than eugenicist should take up the task.—*H. H. Laughlin.*

260. POPENOE, PAUL, AND ROSWELL H. JOHNSON. **Applied eugenics.** *14 × 20 cm., v + 459 p., 46 fig.* The Macmillan Co.: New York, Oct., 1918.

261. SCHIEMANN, E. Review of: A. HAENICKE. **Vererbungsphysiologische Untersuchungen an Arten von Penicillium und Aspergillus. (Genetical investigations on species of Penicillium and Aspergillus.)** Zeitschr. Bot. 8: 225–343. *1 pl., 11 fig.* 1916. Zeitschr. indukt. Abstamm. Vererb. 19: 310–311. Aug., 1918.—Author found all degrees of constancy or inconstancy of variations in *Aspergillus* and urges a revision of the concept "mutation." Reviewer holds that mutation among higher organisms with sexual reproduction has become entirely definite concept, but that Bacteria hold a unique place because, due to lack of sexuality, inheritance and non-inheritance can not be distinguished. Bacteria should be grouped

therefore with those higher organisms in which sexual reproduction is wanting, not forgetting that persistent modifications may be paralleled with hereditarily constant characters which occur in nearest-related forms with sexual reproduction (*Paramecium*, *Phycomyces*). Each investigator must follow his own taste in such cases, as to which analogy he prefers.—*Geo. H. Shull.*

262. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: A study of bud variation in the Washington navel orange.** U. S. Dept. Agric. Bull. 623. *146 p., 19 pl., 16 fig.* 1918.—See Bot. Absts. 2, Entry 707.

263. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: A study of bud variation in the Valencia orange.** U. S. Dept. Agric. Bull. 624. *120 p., 14 pl., 9 fig.* 1918.—See Bot. Absts. 2, Entry 708.

264. Shamel, A. D. **Bud variation in dahlias.** Jour. Heredity 9: 362–364. *Fig. 11–12.* Dec., 1918.—See Bot. Absts. 2, Entry 706.

265. Shull, A. Franklin. **Symposium on the trends in zoology. 2. The trend of genetics.** Rept. Michigan Acad. Sci. 20: 105–108. 1918.—Author sees no increased tendency of genetics toward utilitarian ends as result of war conditions, and thinks this is to be regretted. Mere demonstration that characters Mendelize is no longer sufficient. Fundamental progress can be made now only in relating facts of genetics to other facts of biology. Central theoretic aim of genetics is discovery of method of evolution by study of origin of changes and their preservation. Discoveries of Morgan and his workers should loom large in genetics for many years to come. Concerning genes, future should reveal what they are, whether enzymatic for example; how they produce their somatic effect; whether relatively stable or readily alterable.—*J. P. Kelly.*

266. Shull, A. F. **Environment and inherited characters in Hydatina senta.** Biol. Bull. 35: 335–350. 1918.

267. Stockard, Charles R. **Hereditary deficiencies in the sense of smell.** Science 49: 237–239. Mar. 7, 1919.

268. T. W. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 46. Jan. 25, 1919.

269. Voorhoeve, N. **Hereditary abnormalities.** Lancet 1918 (ii): 740–741. 1918.—"A genealogical chart is presented of a family showing abnormalities through four generations. The survivors, a father and his two daughters, all have brittle bones and blue sclerotics; haemophila also figures in the family tree, and was present in the father but not in the daughters. The disorders are put down to hereditary inferiority of mesenchyme." [Abst. from Physiol. Abst. 3: 499. Jan., 1919.]—*W. D. H[alliburton].*

270. Woods, Frederick Adams. **Will not morality necessarily improve?** Jour. Heredity 9: 331–332. Nov., 1918.—Answer to Popenoe's article, "Will morality disappear?" [See Bot. Absts. 2, Entry 259]. Author grants that birth rate among America's biologically best has been recently declining rapidly, but hopes that parental instinct will save morality, holding that there is correlation between the two. Short criticism of methods in evaluating social leaders is given.—*H. H. Laughlin.*

271. Woods, Frederick Adams. **Kaiserism and heredity.** Jour. Heredity 9: 348–353. *1 chart.* Dec., 1918.

272. Zeller, J. H. **A simple hog-breeding crate.** U. S. Dept. Agric. Farmers' Bull. 966. *4 p., 1 fig.* 1918.—Directions for making and operating a hog-breeding crate. Increases the number of successful matings.—*H. K. Hayes.*

HORTICULTURE

W. H. Chandler, *Editor*

273. Coit, J. E., and R. W. Hodgson. **The June drop of Washington navel oranges—Bulletin No. 290,** California Agric. Exp. Sta. Bull. **290**: 203–212. Jan., 1918.—June drop of Washington navel oranges causes an annual loss of $1,225,000 to $1,750,000 in California and is the limiting factor in profitable navel-orange production in many parts of the interior valleys of California and Arizona. The drop itself can be separated into two parts, that occurring from petal fall until the fruit is about an inch in diameter, and that occurring after that time. The first part is much the more serious and is due to abnormal water relations which serve as a stimulus to abscission. The second part is less important and is due to the fungus *Alternaria citri* of wide distribution which is also the cause of black rot of navel oranges. The fruits showing the black rot represent those infected fruits which managed to survive to maturity, other infected fruits having fallen, chiefly during the months of July and August.—The water-relations drop bears a definite relation to climatic conditions and all efforts looking toward prevention or control must be either in the nature of modifying environmental conditions, or in selection for dry-heat strains. Of these two the former seems to promise the more immediate results.—*E. O. Essig.*

274. Coit, J. Eliot. **The etrog or cedrat of the Hebrews.** California Citrograph **6**: 3. 3 *fig.* Nov., 1918.—The only reference to a citrus fruit in the Bible is in Leviticus 23:40, the word "hadar," translated "goodly trees," referring to the citron which the Hebrews use in their ceremonials at the Feast of the Tabernacles. Since the beginning of the war the supply from Trieste and Greece has been entirely cut off and Jewish rabbis are searching California for specimens. The possibilities of etrog culture in California are considered, the profits being regarded as problematical, although the fruit could be made into candied citron if the demand for etrog fell off.—*I. J. Condit.*

275. Halligan, C. P. **Horticultural notes.** Michigan Agric. Coll. Quart. Bull. **1**: 31. Aug., 1918. The author notes the value of acid phosphate in stimulating growth and vigor of young apple trees.—*R. D. Anthony.*

276. Hawley, I. **The blooming period in olives and its lessons for the grower.** Fig and Olive Jour. **2**: 9–11. *1 fig.* April, 1918.—Divides the annual life of the olive into three periods; the first, March 15 to June, constituting the blooming period; the second June 1 to December 15, comprising the period when the fruit is matured and new growth produced; and the third, completing the cycle to March 15, constituting the rest period. Emphasizes the importance of careful observation during the blooming period as at this time more can be learned regarding the general health and thrift of the trees than at any other time. Takes a fruiting branch and traces the stages in the development of flower buds into flowers and on until the fruit is past the critical period, illustrating each stage with a photograph. Discusses the balance existing between energies of the tree going into development of fruit and into production of new wood. Lays alternate habit of bearing to lack of proper balance between the two. Trees bearing too much fruit do not have sufficient strength to develop fruit wood for next season's crop. Finds 162 flower buds on the twig pictured which on basis of 2500 fruit bearing twigs to a twenty-year old tree would give 290,000 flowers. Of these flowers nearly 90 per cent are imperfect, possessing only rudimentary pistils. These are commonly called "male" flowers. Only the perfect or "female" flowers set fruit. Of the 162 flowers on the twig in question 8 flowers or 7 per cent set and brought fruit to maturity. Twice this many were set but half subsequently dropped off. Figuring 125 olives to the pound and the maturity of seven per cent of 290,000 flowers, a yield of four tons of fruit to the acre would be obtained. Practical growers know this to be undesirable as, even if possible, the fruit would be undersized. Concludes that a set of 3.5 per cent approaches a normal condition, allowing the tree to develop fruit wood for the next season, and still mature a crop of large-sized fruit. —*R. W. Hodgson.*

277. HAWLEY, I. **The pollination and fertilization of the olive blossom.** Fig. and Olive Jour. 2: 1–2. May, 1918.—Distinguishes between pollination and fertilization, the former constituting the mechanical processes concerned in carrying the pollen grain to the stigma, the latter consisting of the fusion of the two sex cells. The olive is wind pollinated as evidenced by the enormous amount of pollen produced as well as by the absence of nectar and odor and no provision made for insect pollination through morphological adaptations in the flower. Concludes that instead of being beneficial bees are actually detrimental in that the absence of nectar forces them to feed on the pollen itself. Thrips are said to be an aid in effecting pollination. Inadequate pollination is held responsible for smaller quantity of fruit produced in tops of trees. Mentions rains, frost, excessive heat, and strong winds as climatic conditions hindering or preventing pollination. Considers possibility of increasing yields by cross fertilization, stating that there is evidence supporting this idea. Mission and Manzanillo varieties said to be self fertile. Suggests experimental work to prove the point. Places burden for such work upon the Agricultural Experiment Station. Considers the problems concerned with the setting of the fruit of prime importance in such investigational work, giving ideas current among growers regarding causes of shedding of immature fruits.—*R. W. Hodgson.*

278. SHAMEL, A. D. **Furrow manure method of feeding orange trees.** California Citrograph 4: 5. *3 fig.* Nov., 1918.—The writer answers a number of inquiries regarding the furrow method of distributing manure in citrus orchards. Application during the late summer and fall months is advised, the furrows in general being made from 6 to 8 inches deep.—*I. J. Condit.*

279. SHAMEL, A. D. **Can California produce good grapefruit?** California Citrograph 3: 153. May, 1918.—The writer when first coming to California became prejudiced against California grapefruit by eating an unripe sample. Later experience with the ripe fruit reversed his first opinion and caused him to make a study of the grapefruit situation.—The conclusions from this study are summarized under four heads:—First. Much of the inferior grapefruit which has in the past been marketed by California comes from trees of inferior strains. These are the result of careless bud selection by the nurseryman. In a careful study of 500 trees in one of the best grapefruit groves of California, 25 per cent of the trees were found to be of inferior strain, bearing round fruits, containing many seeds, and of poor flavor and quality. The best strain of trees in this orchard bore flattened fruit, with thin rinds, abundance of juice of fine quality and flavor, and few or no seeds.—Second. Until five years ago a large part of the California grape-fruit crop was picked in the winter when the fruits were unripe and sour. Since then by allowing the fruit to ripen on the tree and marketing it in the summer, after the Florida crop has been disposed of and before the Porto Rico crop reaches the market, better results have been obtained. Third. All locations are not equally suitable for producing good grapefruit. Best results are obtained on sandy soils and at higher elevations.—Fourth. It is practicable to eliminate much of the poor quality grapefruit in the packing house. Packing house managers should be trained to segregate and pack the fruit of best quality.—The practical way to improve established orchards of Marsh grapefruit is to eliminate trees bearing seeded or poor grade fruit. The way to improve the Marsh variety is to propagate only the best strains. In a seven year study where 9 fruits per tree were cut each year, 19 trees of best strain averaged 2.6 seeds per fruit, while four trees of the rough, seeded strain averaged 52.2 seeds per fruit.—*C. S. Milliken.*

280. SHAMEL, A. D. **Better California grapefruit.**—California Citrograph 3: 94. March, 1918.—During the year 1917 progress was made in many California grapefruit orchards in replacing the poor strains of Marsh Seedless trees by rebudding with the best strains. Budwood from the best strains was made commercially available by the California Fruit Growers Exchange.—The culture of the improved strain of Marsh grapefruit in California has proved profitable. The favorable change in market conditions toward California grapefruit may be attributed to: (1) Shipment of fruit from May to October, when it is ripe, instead of the ship-

ment of immature fruits from December to May. (2) The steady elimination from the orchards of trees producing coarse, thick-skinned, seeded fruits, leaving the trees producing smooth, thin-skinned, commercially seedless fruits. (3) More careful grading and packing. —That the best strain of Marsh grapefruit can be successfully propagated by careful bud selection was clearly shown in a survey made by the author of the groves where attention to this bud selection was practiced either in setting out young trees or in working over old trees. Many of the poor trees now occurring in California orchards have been definitely traced to carelessness in bud selection by nurserymen.—*C. S. Milliken.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

281. ADAMS, J. F. **Origin and development of the lamellae in Schizophyllum commune.** Mem. Torrey Bot. Club 17: 326–333. *Pl. 1, 2 fig.* 1918.—In *Schizophyllum* the lamellae originate by formation of endogenous gill cavities in a manner similar in principle to that which Levine finds in *Cropinus micaceus.* The gill cavities are lined from the first by a palisade layer and represent the space between the adjacent halves of two lamellae. Gill cavities split along the lower edge and lamellae are thus formed from the adjacent walls of two gill cavities. The tissue below the gill cavity becomes looser in texture, thus favoring the splitting. The pileus enlarges by growth of primary lamellae and development of additional lamellae formed from gill cavities. It is evident from this method of the origin of the gill cavities as independent tubes, that gills in their essential nature are hymenium-bearing plates between independently originating endogenous gill cavities.—*R. H. Denniston.*

282. DODGE, B. O., AND J. F. ADAMS. **Some observations on the development of Peridermium cerebrum.** Mem. Torrey Bot. Club 17: 253–261. *Pl. 4–6, 3 fig.* 1918.—Authors made a study of this fungus on *Pinus rigida* in the vicinity of Lakehurst and Toms River, New Jersey. Canker-like swellings were found to be either elongated or circular and were found on trunks up to 18 inches in diameter. At least half of the trunk is very often girdled. Very often effect on host is to produce a fusiform enlargement of the stem while in other cases a bend or knee is formed. Mycelium is uninucleate and appears to follow the medullary rays. Haustoria are found especially in phloem and medullary rays. The bark is split by the developing gall and spermatia exude in yellowish droplets. Spermagonia are not definitely delimited units. It is not possible to determine accurately very long in advance those swellings which will produce aecidia. Gametophoric hyphae are eight or more cells in length. In the canker-like swellings of the New Jersey material no galls were found bearing both aecidiospore and spermatium galls. Mature uredosori were found on seedlings of *Quercus ilicifolia* and *Q. marilandica* which were located within two feet of the infected base of a pine tree. Infections were made on *Quercus ilicifolia, Q. marilandica,* and *Q. heterophylla.* [See Bot. Absts. 2, Entry 508.]—*E. T. Bartholomew.*

283. KYLIN, H. **Studien über die Entwicklungsgeschichte der Phaeophyceen. [Studies on development of Phaeophyceae.]** Svensk Bot. Tidsskr. 12: 1–64. 1918.—A number of observations support the author's contention that the reduction divisions in the Phaeosporeae occur in connection with spore formation. Members of this group were grown in culture solutions containing sodium nitrate, and sodium nitrate with potassium phosphate. Fertile *Chorda* was found only in the latter, as were also germinating zoospores of *Stilophora rhizoides* and *Asperococcus bulbosus.* In the latter the author finds a few plurilocular sporangia on the gamete-bearing individuals. These individuals are a little smaller than the spore-bearing plants. In *Ectocarpus tomentosa* the gametes do not copulate but develop parthenogenetically, which condition is believed to be a derived one. In *E. siliculosus* the plurilocular sporangia may produce either gametes or asexual spores, "parthenogenetic gametes," which in turn produce gamete-bearing plants again. The zygote produces a sporophyte and reduc-

tion occurs in the division of the primary nucleus of the unilocular sporangium. Male and female gametophytes, microscopic in size and with their sex organs, are reported for *Chorda filum*. Only one sperm is produced in each antheridium and this has not yet been found free, nor has fusion been observed. Reduction division occurs as in *E. siliculosus*. *Chorda* should be included among the Laminariaceae. The paper concludes with an outline of the various types of alternation of generations in the Phaeosporeae.—*C. H. Farr.*

BRYOPHYTES

284. Haupt, Arthur W. **A morphological study of Pallavicinia Lyellii.** Bot. Gaz. 66: 524–533. *Pl. 20–24.* 1918.—After a brief note on the relationships of the genus *Pallavicinia* the author describes the morphological features of the widely distributed *P. Lyellii*, devoting especial attention to the sexual organs and the sporophyte. He finds that the development of the antheridium is essentially the same as in the other genera of the anacrogynous Jungermanniales and notes the peculiar involucral structures which are found in connection with the elongated groups of antheridia. In the case of the archegonium he emphasizes the long neck, sometimes containing as many as eighteen neck canal cells, and shows how the characteristic tubular perianth develops after fertilization. In the sporophyte the lower segment found by the first wall in the fertilized egg undergoes very few divisions and forms a haustorial organ, similar to what has been described in *P. Zollingeri* and *Aneura pinguis*. The upper segment forms the bulk of the sporophyte, the differentiation of the sporogenous tissue occurring relatively late; in this respect *P. Lyellii* agrees with the closely related genus *Symphyogyna*. An inconspicuous cap is formed at the apex of the capsule and dehiscence takes place by means of four longitudinal slits, the valves remaining attached at the tip. The figures illustrate fully the various developmental processes described.—*Alexander W. Evans.*

PTERIDOPHYTES

285. Brown, E. D. W. **Apogamy in Camptosorus rhizophyllus.** Bull. Torrey Bot. Club 46: 27–30. *Pl. 2.* 1919.—Prothallia of *C. rhizophyllus* were reared from spores in small glass capsules containing 26 cc. of Knop's full nutrient solution. Ten weeks after sowing, a single apogamous sporophyte appeared on one of the prothallia. Normal sporophytes followed later.—*J. H. Faull.*

286. Darnell-Smith, G. P. **The gametophyte of Psilotum.** Trans. Roy. Soc. Edinburgh 52′: 79–91. *Pl. 1–2.* 1918.—Spores of *Psilotum*, sown in the laboratory between pieces of sandstone, and in the field, germinated and the earlier stages in the development of the gametophyte were followed. Mature gametophyte is described as a cylindrical, single or branched, saprophytic body, bisexual, subterranean, light brown in color, radially symmetrical and densely covered with long brown rhizoids. It is best found by carefully searching with a hand lens quantities of soil taken from rock fissures in the habitat of adult plants.—*J. H. Faull.*

287. Lawson, A. A. **The gametophyte generation of the Psilotaceae.** Trans. Roy. Soc. Edinburgh 52^1: 93–113. *Pl. 1–5.* 1918.—Author gives a full account of the gametophytes of *Tmesipteris* and *Psilotum*. Both are hypogeous, ½ inch or more below surface of soil, and are remarkably alike. They are light brown, cylindrical, branched and devoid of chlorophyll. Their tissues are occupied by a mycorrhizal fungus. Antheridia and archegonia are always borne upon the same gametophyte and are not localized in their distribution. Male gametes are multiciliate. Archegonium projects slightly beyond surface and possesses a neck of 4 rows of cells and a single canal cell. In *Tmesipteris*, the archegonia are more densely crowded and are more numerous than the antheridia, whereas the opposite is true of *Psilotum*. Moreover, antheridia and archegonia of *Tmesipteris* are about twice as large as those of *Psilotum*. Author concludes that the gametophyte generation of the Psilotaceae bears no structural resemblance to that of *Lycopodium* or *Equisetum* and that Psilotaceae are phylogenetically very remote from either Lycopodiales or Equisetales. [See Bot. Absts. 1, Entry 973]—*J. H. Faull.*

SPERMATOPHYTES

288. Pulling, Howard E. **Root habit and plant distribution in the far north.** Plant World 21: 223–233. *1 fig.* 1918.—Author discusses root habit of some of the common forest trees of the far north. Recognizes two types of root system, deep and shallow, between which various transitions may occur. Presents evidence that some species have a root habit which is rigidly maintained under varying external conditions, whereas in others the root habit is much more flexible. When the root system is deep and inflexible, the species is obviously unable to grow on shallow soils, such as those prevailing in the far north. Degree of flexibility of root habit and degree of penetration may thus be factors in determining northward distribution of many species. Root systems of black spruce, tamarack and canoe birch are classed as rigid and shallow; of white spruce as flexible and shallow; and of jack pine and white pine as deep and rigid.—*E. W. Sinnott.*

289. Smith, Charles Piper. **Studies in the genus Lupinus. II. The Microcarpi exclussive of Lupinus densiflorus.** Bull. Torrey Bot. Club 45: 1–23. *16 fig.* 1918.—**Same general title. III. Lupinus densiflorus.** Bull. Torrey Bot. Club 45: 167–203. *25 fig.* 1918.—These studies of *Lupinus* are from the taxonomic standpoint. Many diagrams of floral parts are given to show diagnostic characters.—*Margaret C. Ferguson.*

290. Humbert, E. P. **A striking variation in Silene noctiflora.** Bull. Torrey Bot. Club 45: 157–158. *2 fig.* 1918.—Author reports an abnormal seedling in which three seed leaves were produced, and succeeding leaves were arrayed in whorls of three, each leaf of the new whorl being placed above an interval between leaves of the preceding whorl. [See Bot. Absts. 1, Entry 898.]—*V. A. Pease.*

291. Hastings, G. T. **Some abnormal poplar flowers.** Torreya 18: 16–18. *4 fig.* 1918.—A case is reported in which several branches of a pistillate tree of *Populus grandidentata* bore catkins made up of staminate, pistillate, and perfect flowers arrayed without regular order, the flowers at the tips of the catkins being most irregular. There is nothing to indicate that the perfect flowers show reversion to ancestral conditions, the explanation lying rather in some irregularity of chromosome division. Drawings of both normal and abnormal flowers are given.—*V. A. Pease.*

PATHOLOGY

Donald Reddick, *Editor*

292. Boas, Friedrich. **Zur Kenntnis des Russtaues der Johannisbeere und verwandter Erscheinungen. [Sooty mould of currants and similar manifestations.]** Zeitschr. Pflanzenkr. 28: 114–116. 1918.—Sooty mould was abundant on currants in 1917. Investigations with microscope and by means of cultures shows that a variety of fungi occur there and in this instance no representative of genus *Fumago* was found. Species of *Dematium* were found oftenest but Cladosporia, sterile mycelia, mucor, yeasts, etc., were found abundantly. Author agrees with Neger (Flora 10: 67. 1917) that *Fumago* sp. is rarely present in sooty moulds.—In greenhouses, on the other hand, sooty mould is almost always *Fumago.*—*D. Reddick.*

293. Christiansen, Johanne. **Om alkoholdesinfektion. [Alcohol disinfection.]** Hospitalstidende, Kjöbenhavn 1918: 33–34. 1918.—The description of a series of disinfection experiments with various water-soluble antiseptics, various alcohols and acetone. Especial attention is paid to methyl, ethyl and propyl alcohol, with regard to their use as skin disinfectants. The tables and curves, accompanying the paper, show that the molecular percentage of an alcohol in alcohol-water mixture is the dominant factor and independent of the superficial tension in inhibiting bacterial growth, while the actual bacteria-killing properties are solely dependent upon the superficial tension. Propyl alcohol is found superior to ethyl alcohol, which again is superior to methyl alcohol, the higher homologues of the alcohols of

the same series have not been investigated, for the reason, that they do not mix with water in all proportions, so their practical application is out of question. A more extensive use of propyl alcohol in the place of ethyl alcohol as a skin disinfectant is advocated on the basis of the experiments described. [From abst. by G. H[ansen] in Abst. Bact. 2, Entry 775. 1918.] —*D. Reddick.*

294. Dodge, B. O. **Studies in the genus Gymnosporangium. II. Report on culture made in 1915 and 1916.** Bull. Torrey Bot. Club 45: 287–300. *Pl. 8.* 1918.

295. Felt, E. P. **Key to American gall insects.** New York State Mus. Bull. 200. *310 p., 16 pl.* 1917. (1918).—This key is arranged with reference to the host plants on which the galls occur and will be of value to those who have occasion to collect and determine plants or to study abnormal plant growths. It is the only reasonably complete publication of the kind in America. There are a total of 1439 species, most of which can be recognized by means of the key, the 250 text illustrations and the 16 full page plates. The publication is indexed both with reference to the host and the parasite.—*Mel. T. Cook.*

296. Gammie, G. A. **Fungi and disease in plants: A review.** Agric. Jour. India 13: 666–670. 1918.—Review of: E. J. Butler. Fungi and disease in plants.

297. Harvey, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83–104. *Pl. A [colored] and 7–11.* 1918.—See Bot. Absts. 2, Entries 120, 374.

298. Hemmi, Takeo. **On the Gloeosporiose of Caladium.** [Text in Japanese] Trans. Sapporo Nat. Hist. Soc. 7: 41–70. *Pl. 1.* 1918.—The fungus presents a brown discoloration on the leaves of *Caladium* grown in Japan and finally kills the plant. From many cultural experiments the author notices that the fungus in question grows well on a medium acidified with a relatively strong acid. Especial attention was given to tannic acid. Chlamydospores were frequently present under certain condition of the culture media or in a medium which contained some toxic substance. The optimum temperature for the growth of the fungus is about 27–28°C. the maximum is very near to 38°C. and the minimum about 6–7°C. The fungus liquefies gelatine very slowly. The author proposed the name *Gloeosporium Aracearum*, for the causal fungus.—*T. Matsumoto.*

299. Kunkel, L. O. **Tissue invasion by Plasmodiophora brassicae.** Jour. Agric. Res. 14: 543–572. *Pl. 61–80, fig. 1–2.* 1918.—The work was done to determine the time and nature of infection of crucifers by the club-root organism. It was found that by the use of small paper cylinders or melted paraffin to hold the inoculum in place, not only the roots but also the stems easily become infected. Although clubs may differ greatly in size many of them are alike in shape. They are formed by infection resulting either from direct penetration of the slime-mould, or through distribution of the organism by host cell divisions. The root hairs as a means of entrance are of no importance to *Plasmodiophora brassicae.* After direct penetration the organism follows no special course but moves in all directions through the bark. Probably on account of the abundant supply of food in the cambium, the plasmodia enter the cambial tissue, where they pass through the very thin walls until finally they reach the stem opposite the point where they originally entered. They also spread up and down the stem. The club thus results largely from the abnormal growth of the infected cambium. The invasion into the cambium brings about a lack of development in the xylem tissue, so that on a warm day the leaves are no longer able to obtain as much water as they transpire, and the plant wilts. A ratio of the uninvaded cells and those filled with spores is given, and the question of immunity discussed briefly in relation to the cells not infected. A comparison is made of the galls of *Plasmodiophora brassicae* with those of *Spongospora subterranea* and other genera of the Plasmodiophoraceae, with the conclusion that the other genera produce galls morphologically like those described for *Plasmodiophora brassicae* and unlike those caused by *Spongospora subterranea.*—*Charles Chupp.*

300. MIURA, SHIKUTARO. **On the grain of barley or wheat infected by smut fungus through the flower.** [Text in Japanese.] Ann. Phytopath. Soc. Japan. 1: 16–26. 1918.—The grains of barley and wheat infected by smut through the flowers are smaller than those of healthy ones in length, width, and thickness, as well as lower in weight and specific gravity. The mycelium of the fungus is found in the embryo at least 3 days after infection. Smut spores germinate with difficulty on other portions of a flower than the stigma. From the experiments it is doubtful that the mycelium can enter through the walls of pistils.—*T. Matsumoto.*

301. SCHAFFNIT, E., AND G. VOSS. **Versuche zur Bekämpfung des Kartoffelkrebses im Jahre 1917. [Investigations in 1917 on control of potato wart.]** Zeitschr. Pflanzenkr. 28: 111–114. 1918.—Attempts were made to kill the organism (*Chrysophlyctis endobiotica*) in the soil by treatment of the soil with the following substances the numbers referring to grams or cubic centimeters per square meter. Potash, 300 and 600; lime nitrogen, 80 and 120; sulfur, 150; sodium cyanide 100; "uspulun," 75; betalysol, 150; chromium acid carbonate, 100; chromium oxid, 100; formaldehyde, 250 and 500. None gave any indication of control. This confirms work in two previous years (Zeitschr. Pflanzenkr. 26: 182 and 27: 339).—Of seventy varieties tested the following, in a test extending over three years, have not shown the disease: Paulsen Juli von 1912, Verb. Lange Sechswocher, Poppehurt, Koralle, Lech, Danusia, Lucya, Ada, Ideal, Jubelkartoffel, Blaue Rhein. Rauhschalen, Agraria, Concordia, Erika, Marschall Vorwärts, Roland.—Tests in a field not cropped with potatoes since 1909 show that the organism persisted in soil for nine years.—*D. Reddick.*

302. SHIRAI, MITSUTARO. **On the development of plant pathology in Japan.** Ann. Phytopath. Soc. Japan. 1: 1–4. 1918.—A brief historical sketch of plant pathology in Japan, especially in Tôkyô, is given.—*T. Matsumoto.*

303. WILCOX, R. B. **Notes on cranberry disease investigations of the Bureau of Plant Industry.** Proc. Forty-ninth Ann. Conv. Amer. Cranberry Assoc. 1918: 19–21. 1918.—A progress report of investigations on cranberry diseases, largely along the lines of work previously outlined in Bulletin 714 of the U. S. Department of Agriculture, entitled "Spoilage of cranberries after harvest."—*Neil E. Stevens.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

DIFFUSION AND PERMEABILITY

304. WILLIAMS, MAUD. **The influence of immersion in certain electrolytic solutions upon permeability of plant cells.** Ann. Bot. 32: 591–599. 1918.—Cells of the petioles of *Saxifraga umbrosa* immersed in certain concentrations of such electrolytes as aluminum chloride, barium chloride, potassium chloride, potassium nitrate, and barium nitrate, became permeable to 0.2 per cent ferric chloride. Normally these cells are impermeable to ferric chloride of this strength for very long periods. The entrance of the ferric chloride was indicated by its reaction with the tannin contained in the cells. The time of immersion needed to produce abnormal permeability depends upon the concentration and the electrolyte. For aluminum chloride, potassium chloride, potassium nitrate, and barium nitrate results suggest approximately the relation: $\log T = \text{constant} - A\ ((\log C) + 1)$, where T = time of immersion needed to render membrane permeable to 0.2 per cent ferric chloride, C = concentration in gram-mols per liter, A = constant depending upon electrolyte used. Abnormal permeability with regard to the ferric chloride could be produced without the membrane becoming permeable to a rose-colored material frequent in the sap of the cells.—*S. M. Zeller.*

WATER RELATIONS

305. FARMER, J. BRETLAND. **On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Part I. The evergreens.** Proc. Roy. Soc. London B, 90: 218–232. *Fig. 1–2.* 1918.—This paper is abstracted under the following entry, 306.

306. Farmer, J. Bretland. **On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Part II. The deciduous plants.** Proc. Roy. Soc. London B, 90: 233–250. *Fig. 1–3.* 1918.—From extensive investigations the methods of which are described in detail, it is found that the efficiency of the wood of evergreens in conducting water is relatively low as compared with that of deciduous plants. Fluctuations in the case of evergreens are relatively small, while with deciduous plants they are sometimes marked. A considerable difference was noted in the water-conducting capacity of normal adult wood and that of "leaders" of young trees, and the wood of arborescent and frutescent monocotyledonous plants proved defective in water-conductivity. [See also the next preceding Entry, 305.]—*R. A. McGinty.*

307. Folsom, Donald. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. 2: 209–276. *Fig. 1–24.* 1918. [Abstract of this paper was preprinted as Physiol. Res. Prel. Absts. v. 2, no. 5, serial No. 15, 1918.]—This paper describes extensive experiments along the line indicated by the title. Growing *Ranunculus sceleratus* and *R. abortivus* under conditions of water supply varying from submergence of soil and plant to just enough moisture to support life, it was found that they agreed in regard to their relation to water supply in giving progressively smaller values with progressively lower water supply for the following plant features: thickness of stem cortex, thickness of stem aerenchyma, stem bundle interval, petiolar width of root-leaves, and laminar area of root-leaves. The two species did not show any apparent relation to water supply in regard to number of xylem strands in root and in stomatal frequency of upper surface of root-leaves; and they appeared to disagree in their relation to water supply for the following features: root radius, stelar radius of root, thickness of root aerenchyma, stomatal frequency of lower surface of root-leaves, number of layers of chlorenchyma, thickness of root leaf chlorenchyma, number of layers of root leaf palisade, and thickness of root-leaf palisade. [See Bot. Absts. 1, Entry 1484.]—*R. A. McGinty.*

308. Kelsick, R. E. **Some observations on the relation of lint length to rainfall.** West Indian Bull. 17: 79–82. 1918.—Observations on the lint length of different strains of Sea Island cotton during seasons of varying weather conditions indicate that the length of the lint is dependent upon the water supply of the plant at the critical period of development of the boll.—*R. A. McGinty.*

309. McClelland, C. K. **The time at which cotton uses the most moisture.** Jour. Amer. Soc. Agron. 10: 185–189. 1918.—Cotton requires less total water than corn or oats. An ample supply of water is needed at the time of blossoming and of setting of the bolls. A small water supply induces plants to blossom early. Plants grown in potometers used the largest amounts of water at the time blossoms were appearing rapidly. Suggestions to the practical grower are attempted.—*H. S. Reed.*

MINERAL NUTRIENTS

310. Hendry, G. W. **Relative effect of sodium chloride on the development of certain legumes.** Jour. Amer. Soc. Agron. 10: 246–249. 1918.—Observations upon the effect of sodium chloride on varieties of beans grown in sand cultures plus nutrient solutions. The Windsor bean (*Vicia faba*), the blackeye cowpea (*Vigna sinensis*), and the Mexican garbanzo (*Cicer arietinum*) were less injured by sodium chloride than the other varieties tested. The Lewis lima (*Phaseolus lunatus*), and the white tepary (*P. acutifolius* var. *latifolius*) were less affected by sodium chloride than varieties of *Phaseolus vulgaris* tested. Nodule production was checked to a varying degree in all cases observed.—*H. S. Reed.*

311. McIntire, W. H. **The growth of sheep sorrel in calcareous and dolomitic media.** Jour. Amer. Soc. Agron. 10: 29–31. *Pl. 1.* 1918.—Pot culture experiments show that sheep sorrel (*Rumex acetosella*) maintains a good growth in strongly alkaline soil when not subjected to the intervening influence of clover or other lime-loving plants.—*F. F. Halma.*

312. SCHREINER, O., AND J. J. SKINNER. **The triangle system for fertilizer experiments.** Jour. Amer. Soc. Agron. 10: 225-246. *Pl 5-7, fig. 28-41.* 1918.—A description of a method of conducting experiments in field or laboratory which has been found useful, especially where three variables are introduced. Presentation of data by such a diagram gives an intelligent and comprehensive view of the results.—*H. S. Reed.*

313. SHUTT, F. T., AND E. A. SMITH. **The "alkali" content of soils as related to crop growth.** Trans. Roy. Soc. Canada III, 12^{III}: 83-97. *Fig. 1-5.* 1918.

PHOTOSYNTHESIS

314. MOORE, BENJAMIN. **The formation of nitrites from nitrates in aqueous solution by the action of sunlight, and the assimilation of the nitrites by green leaves in sunlight.** Proc. Roy. Soc. London B, 90: 158-167. 1918—The author reports that dilute solutions of nitrates on being exposed to sunlight or other light of short wave-length, underwent conversion from nitrate to nitrite. On immersing green leaves in the solution, comparatively little nitrite accumulated, due, the author concludes, to the fact that the leaf absorbs the nitrites as they are formed, thus indicating that the early stages of synthesis of nitrogenous compounds are carried out in the green leaf aided by sunlight.—*R. A. McGinty.*

315. MOORE, BENJAMIN, AND T. A. WEBSTER. **Action of light rays on organic compounds, and the photosynthesis of organic from inorganic compounds in the presence of inorganic colloids.** Proc. Roy. Soc. London B, 90: 168-186. 1918.—Certain inorganic systems, such as solutions of ferric salts, uranic salts, silicic acid, beryllium chloride, etc., in the presence of carbon dioxide and on exposure to light, are able to effect the formation of formaldehyde; while ferrous sulphate, ferrous chloride, zinc chloride and certain other substances do not bring about this action.—Formaldehyde under various conditions, involving light in each case, gave rise by condensation to substances which had the power of reducing Benedict's solution. This indicated that true carbohydrates would ultimately be formed by this means. An effort was made to get an osazone test with the products formed, but this was unsuccessful.—The various sugars, starch, glycogen, egg albumin, milk, and a number of vegetable juices on exposure to sunlight or ultra-violet light showed the presence of formaldehyde, which was assumed to be due to a reversible reaction corresponding to that by which all organic matter has been built up from inorganic sources.—*R. A. McGinty.*

METABOLISM (GENERAL)

316. HORI, S., AND U. BOKURA. **Soy bean as a substitute for peptone in the preparation of the nutrient media.** Ann. Phytopath. Soc. Japan 1: 27-31. 1918.—Since the outbreak of the war the cost of preparing culture media in mycological and bacteriological laboratories in Japan, especially preparing the culture media for mouse typhus bacteria, has greatly increased, therefore the authors studied many materials in order to find an economic substitute for peptone. After many experiments the conclusion was reached that pulverized soy bean cake gave the most satisfactory results, 30 grams of the material being substituted for 20 grams of peptone. As a matter of fact, on this substitute the mouse typhus bacteria exhibit more vigorous growth than on the peptone media. A comparison of prices, an analysis of total nitrogen, and a brief statement of the method of preparation is given. [See Bot. Absts. 2, Entry 1042.]—*T. Matsumoto.*

METABOLISM (NITROGEN)

317. BOTTOMLEY, W. B. **The isolation from peat of certain nucleic acid derivatives.** Proc. Roy. Soc. London B, 90: 39-44. 1918.—A description of methods used in an attempt to isolate nucleic acid from peat is presented, and while no nucleic acid as such was found, the presence of its derivatives is indicative of the decomposition of this compound by bacterial or other agencies.—*R. A. McGinty.*

318. CALL, L. E., AND M. C. SEWELL. **The relation of wood growth to nitric nitrogen accumulation in the soil.** Jour. Amer. Soc. Agron. 10: 35-43. 1918.—It appears from the data

presented that in the past too much emphasis may have been placed on tillage as an agent directly contributing to the formation of nitrates and too little emphasis on it as an indirect means of assisting in the accumulation of nitrates by preventing weeds from using these in their growth.—*F. F. Halma.*

319. Waynick, Dean David. **Variability in soils and its significance to past and future soil investigation. I. A statistical study of nitrification in soils.** Univ. California Publ., Agric. Sci. 3: 240–279. *Fig. 1–2.* 1918.—From a study of variability as regards nitrate production, the author concludes that samples of soil taken from even an apparently uniform field, limited in area, vary so widely as to greatly affect the reliability of any series of results. The results indicate that a single sample of soil is of little value as regards determinations made upon it, and even a number of samples, as ten or sixteen, may give results which have only a low degree of accuracy. In the experiments reported, eighty-one samples were taken from an area 100 feet in diameter, and these gave results which are considered accurate. Increased variability in behavior of samples of soil in the laboratory, over their variability in the field, and its bearing upon the determinations, is discussed.—*R. A. McGinty.*

METABOLISM (ENZYME ACTION)

320. Grey, Egerton Charles. **The enzymes concerned in the decomposition of glucose and mannitol by Bacillus coli communis. Part II. Experiments of short duration with an emulsion of the organisms.** Proc. Roy. Soc. London B, 90: 75–92. *Fig. 1–3.* 1918.—A description is given of methods used in experiments in which it was found that *Bacillus coli-communis*, acting upon glucose in saline solution, gave decomposition products differing quantitatively from those obtained in earlier experiments when the organism was allowed to grow in a mixture of glucose and peptone. The author concluded from the results obtained that succinic acid, acetic acid, and alcohol have a common origin and that lactic acid is formed independently of the formation of the other three products mentioned. It was also found that the enzymes which affect the decomposition of glucose coöperate in the decomposition of mannitol.—*R. A. McGinty.*

321. Grey, Egerton Charles. **The enzymes concerned in the decomposition of glucose and mannitol by Bacillus coli communis. Part III. Various phases in the decomposition of glucose by an emulsion of the organisms.** Proc. Roy. Soc. London B, 90: 92–106. *Fig. 1–2.* 1918.—This paper gives further results of a study of the decomposition products of glucose when acted upon by *Bacillus coli-communis*. It was found that there were several phases of the fermentation which were correlated with increase and diminution in the number of living bacteria present. During one of the phases, i.e., when multiplication of cells was in progress, there was a transformation of glucose into a more complex substance. —*R. A. McGinty.*

GROWTH AND DEVELOPMENT, REPRODUCTION

322. Lees, A. H. **"Reversion" and resistance to "Big Bud" in black currants.** Ann. Appl. Biol. 5: 11–27. *Fig. 1–14.* 1918.—The reversion to the wild type in black currants is characterized by the occurrence of undersized or no fruits, an unusual amount of lateral wood growth, sharp pointed leaves, and long, thin internodes. It is associated with, and apparently caused by, a check to terminal growth brought about by the change of the terminal wood-forming bud into a "Big Bud," a fruit bud, or dead bud. It may be associated with aphis attack. Mite-resistant varieties revert when the wood-forming terminal bud is killed or becomes a fruit bud. Seabrook's Black is mite-resistant because in normal climates and seasons the mite kills the attacked growing point and thus starves itself. This only happens when both climate and variety favor an early and strongly continued check to the growth of the bush. A form of reversion occurring in young bushes before mite or aphis are present is now unaccounted for. Correct pruning and judicious cultural operations are suggested as a possibility for permanent cure.—*S. M. Zeller.* [See Bot. Absts. 2, Entry 1047.]

323. MALLOCK, A. **Growth of trees with a note on interference bands formed by rays at small angles.** Proc. Roy. Soc. London B, 90: 186–199. *Fig. 1–6.* 1918.—A description of an accurate method for the determination of the increase in diameter of trees. The method is based upon observations on the interference bands formed by rays of light at small angles. It was found possible to measure increments in diameter occurring during intervals of one day or even one hour, the lowest measurement specified being 0.025μ-.—*R. A. McGinty.*

324. WALWORTH, E. H., AND L. H. SMITH. **Variations in the development of secondary rootlets in cereals.** Jour. Amer. Soc. Agron. 10: 32–35. 1918.—The number of secondary rootlets in oats, wheat and barley is not constant. Different varieties of a given cereal show characteristic tendencies in the production of these rootlets, and this tendency is greater in barley than in either wheat or oats.—*F. F. Halma.*

GROWTH AND TURGOR MOVEMENTS

325. CROZIER, W. J. [Review of: J. LOEB. **Forced movements, tropisms, and animal conduct.** (See next following Entry, 326.) Monographs on Exp. Biol. 1: 1–209. *Fig. 1–42.* 1918.] Science 49: 171–172. 1919.

326. LOEB, JACQUES. **Forced movements, tropisms, and animal conduct.** Monographs on Exp. Biol. 1: 1–209. *Fig. 1–42.* 1918.—This volume, the first to appear in a proposed series, presents an "analysis of the mechanism of voluntary and instinctive actions of animals" * * * "based on the assumption that all these motions are determined by internal or external forces." The work is of interest to plant physiologists inasmuch as it presents concisely the author's views in the general field, although the data serving as the basis of the analysis are drawn almost exclusively (except in the chapter on chemotropism) from experiments upon animals. [See next preceding Entry, 325.]—*B. M. Duggar.*

327. SMALL, JAMES. **Changes of electrical conductivity under geotropic stimulation.** Proc. Roy. Soc. London B, 90: 349–363. *Fig. 1–14.* 1918.—A report of experiments carried out upon the roots of *Vicia Faba* by means of electrical apparatus. From the results obtained the author believes that the mechanism of geotropic response by the root depends upon permeability changes, since the permeability of the cortical cells of both the upper and under sides of the root-tip increases when the root is placed at an angle with the vertical.—*R. A. McGinty.*

TEMPERATURE RELATIONS

328. McCOLLUM, E. V. **Influence of heat on growth-promoting properties of food.** Amer. Jour. Public Health 7: 191–194. 1918.—From a number of experiments, the writer draws the conclusion that the growth-promoting properties of food are not seriously affected by the heat necessary in cooking or canning. The two dietary essentials, called fat-soluble A and water-soluble B, the absence of which, according to the author, may bring about the disease beri-beri, are found not to be affected to any great degree by a temperature of 112° to 115°C. —*R. A. McGinty.*

LIGHT RELATIONS

329. BROWNING, C. H., AND SIDNEY RUSS. **The germicidal action of the ultra-violet radiation, and its correlation with selective absorption.** Proc. Roy. Soc. London B, 90: 33–38. *Fig. 1–2.* 1918.—The results of experiments are given in which glass plates similar to ordinary photographic plates were coated with nutrient agar and on these were painted a thin layer of bacterial emulsion. A strip of the plates was then subjected to the action of the ultra-violet spectrum. On incubating the plates at 37°C. for forty-eight hours, it was observed that growth had occurred on part of the exposed strips while none had taken place on the remaining part, the last mentioned result being due to the germicidal action of the rays of that portion of the spectrum striking this part of the plates. The authors concluded from

these observations that ultra-violet radiation between wave lengths 2960 and 2100 Å. V. is germicidal to bacteria and that rays over this range of wave-length are particularly absorbed by the substances of which bacteria are composed.—*R. A. McGinty.*

TOXIC AGENTS

330. Walters, A. L., W. F. Baker, and E. W. Koch. **Studies on protozoöcidal and bactericidal action.** Lilly Sci. Bull. 1: 323–345. 1918.—A report of investigations to determine the effect of solutions of several substances upon the action of certain amoebae and bacteria. Solutions of emetine hydrochloride and several others of cephalline, including cephalline iso-amyl ether phosphate, were used.—*R. A. McGinty.*

MISCELLANEOUS

331. Cook, F. C., and Edwin Le Fevre. **Chemical analyses of bacteriological bouillons.** Amer. Jour. Publ. Health 7: 587–589. 1918.—Analyses of beef juices with and without the addition of peptone suggest a reason, the author believes, why higher bacterial counts are often obtained on media prepared from beef bouillon and why certain organisms will grow on such media which fail to grow on media made from beef extract.—*R. A. McGinty.*

332. Shaw, Walter R. **Some microtechnical methods and devices.** Philip. Jour. Sci. C, 13: 241–259. *Fig. 1–5.* 1918.—A description of modifications of various microtechnical methods used by the author, including the use of micrometers, recording magnification on micrographic negatives, concentration of glycerin hastened by the vacuum pump, making sealed glycerin mounts, washing devices for small objects, estimating the number of cells in spheroidal surfaces, etc. [See Bot. Absts. 2, Entry 483.]—*R. A. McGinty.*

333. Vanderleck, J. **Bacteria of frozen soils in Quebec. II.** Trans Roy. Soc. Canada III, $12^{IV,V}$: 1–21. *Pl. 1–5, fig. 1.* 1918.—Results of the previous year stand unchallenged by the data of this paper. The conclusion is that in winter no changes take place in soil. Any action of bacteria depends on the enzymes produced. An extra-cellular enzyme acts as long as the bacteria live, but for the influence of an intra-cellular enzyme active growth is necessary. A superficial study has indicated that ammonification and denitrification are produced by extra- and nitrification by intra-cellular enzymes. This would mean that ammonification and denitrification continue in frozen soils even when bacterial development is at a standstill, while nitrification is impossible.—*S. M. Zeller.*

334. Watson, W. **Sphagna, their habitats, adaptations, and associates.** Ann. Bot. 32: 535–551. *Fig. 1–5.* 1918.—A study of the morphology and ecology of "Sphagna" seems to lead to the conclusion that they obtain their mineral salts from very dilute solutions. They possess a special method of obtaining mineral food by absorbing the base and liberating the acid. In order to do this, special morphological structures apparently of a xerophytic nature furnish the dilute solutions in sufficient quantities and others rid the plants of superfluous acid and water. These structures vary in different groups of *Sphagnum.* During a dry season the intake of water by exposed plants is suspended and the xerophytic structures function to keep the plant in a moist condition until a further supply of dilute solution is available. [See Bot. Absts. 2, Entry 380.]—*S. M. Zeller.*

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor*

BRYOPHYTES

335. Britton, Elizabeth G. **West Indian mosses in Florida.** Bryologist 22: 2. 1919. —The note records an extension of range for two species.—*E. B. Chamberlain.*

336. Nanz, Ralph S. **The southern limit of Eucalypta laciniata.** Bryologist 22: 3. 1919. —The note records the occurrence of the moss near Ithaca, New York.—*E. B. Chamberlain.*

337. WILLIAMS, R. S. **Hylocomium alaskanum (L. & J.) Kindb.** Bryologist 22: 1. *Fig. 1-3.* 1919.—Descriptive notes, figures of the leaves, and range are given.—*E. B. Chamberlain.*

338. WILLIAMS, R. S. **Archidium cubense sp. nov.** Bryologist 22: 2. 1919.—A description of a new species of moss related to *Archidium ohioense.*—*E. B. Chamberlain.*

FUNGI

339. DODGE, B. O. **Studies in the genus Gymnosporangium. II. Report on cultures made in 1915 and 1916.** Bull. Torrey Bot. Club 45: 287-300. *Pl. 8.* 1918.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

PTERIDOPHYTES

340. FITZPATRICK, T. J. **The fern flora of northeastern Iowa.** Amer. Fern. Jour. 8: 97-103. 1918.—This is a list with copious notes of ferns and fern allies collected in northeastern Iowa by the author and other fern students.—*Adele Lewis Grant.*

341. JENNINGS, O. E. **An annotated list of the Pteridophytes of northwestern Ontario.** Amer. Fern Jour. 8: 38-50, 76-88. *Pl. 3, 1 fig.* 1918.—This is an enumeration of the ferns and fern allies collected during five summers spent in northwestern Ontario. A list of the localities explored is included. Two new varieties are described: *Athyrium angustum* (Willd.) Presl. var. *glanduliferum* and *A. angustum* (Willd.) Presl. var. *boreale.*—*Adele Lewis Grant.*

342. MAXON, WILLIAM R. **Further notes on Pellaea.** Amer. Fern Jour. 8: 89-94. 1918. —Notes on the distribution of several species of *Pellaea* occurring in the United States are recorded. A new name is given to *Pellaea aspera* (Hook.) Baker, i.e., *Cheilanthes horridula.* —*Adele Lewis Grant.*

343. MAXON, WILLIAM R. **Notes on American Ferns—XII.** Amer. Fern Jour. 8: 114-121. *Pl. 6.* 1918.—*Pellaea densa* Hook. (*Onychium densum* Brack.) is placed under *Cheilanthes* and named *C. siliquosa* Maxon. *P. membranacea* Davenp. is also transferred to *Cheilanthes* as *C. membranacea* Maxon. *C. pyramidalis arizonica* is described as a new subspecies and *Athyrium alpestre* var. *americanum* Butters is raised to specific rank as *A. americanum* (Butters) Maxon.—*Adele Lewis Grant.*

344. MAXON, WILLIAM R. **A new hybrid Asplenium.** Amer. Fern Jour. 8: 1-3. 1918.—*Asplenium Gravesii*, a natural hybrid between *A. Bradleyi* D. C. Eaton and *A. pinnatifidum* Nutt. is described. The type was collected near Trenton, Georgia,—*Adele Lewis Grant.*

345. MAXON, WILLIAM R. **Polystichum Andersoni and related species.** Amer. Fern Jour. 8: 33-37. 1918.—Three species occurring on the Pacific Coast are discussed namely, *Polystichum Andersoni* Hopkins, *P. Jenningsi* Hopkins, and *P. alaskense*, the last being described as new.—*Adele Lewis Grant.*

346. RANSIER, H. E. **More pleasures from old fields.** Amer. Fern Jour. 8: 8-12. *Pl. 1-2.* 1918.—Variations in the fronds of *Camptosorus rhizophyllus* (L.) Link. are illustrated.—*Adele Lewis Grant.*

347. ROJAS ACOSTA, N. **Addenda ad Floram regionis Chaco australis (pars secunda) [Additions to the flora of the southern Argentina region.]** Bull. Georgr. Bot. 26: 155-165. 1918.—See Bot. Abst. 2, Entry 365.

348. Weatherby, C. A. **Pellaea microphylla Mett. ex Kuhn.** Amer. Fern Jour. 8: 104–108. *Pl. 5.* 1918.—From a study of *Pellaea microphylla* Mett. in the light of recent collections the author concludes that it is a valid species quite distinct from *P. pulchella* Fée with which it has been hitherto associated.—*Adele Lewis Grant.*

349. van Alderwerelt van Rosenburgh, C. R. W. K. **New or interesting Malayan ferns 10.** Bull. Jard. Bot. Buitenzorg 28: 1–56. *Pl. 1–8.* 1918.—Under the above title the author presents the results of extended studies in the Filicales and Lycopodiales. Many new species, varieties, and forms are described, and new combinations made among the ferns proper and in the genera *Lycopodium* and *Selaginella.*—*J. M. Greenman.*

350. van Alderwerelt van Rosenburgh, C. R. W. K. **Two critical fern genera.** Bull. Jard. Bot. Buitenzorg 28: 57–64. *Pl. 9.* 1918.—A brief discussion is given of *Angiopteris* Hoffman and *Lecanopteris* Blume, accompanied by a key to the Malayan species of these genera.—*J. M. Greenman.*

351. van Alderwerelt van Rosenburgh, C. R. W. K. **Two new fern genera.** Bull. Jard. Bot. Buitenzorg 28: 65–66. *Pl. 10.* 1918—Two new genera are proposed namely, *Nematopteris* with one species, *N. pyxidata,* based on *Scleroglossum pyxidatum* v. A. v. R. (*ibid.* 16: 37. *Pl. 9.* 1914) and *Thysanobotrya* also with one species, *T. arfakensis,* based on *Polybotrya arfakensis* Gepp in Gibbs Contrib. 71.—*J. M. Greenman.*

SPERMATOPHYTES

352. Buscalioni, Luigi, and Giuseppe Muscatello. **Studio monografico sulle Specie americane del Gen. Saurauia, Willd.** [A monographic study of the American species of the genus Saurauia Willd.] Malpighia 28: 315–330. 1918.—Buscalioni and Muscatello continue their consideration of the genus *Saurauia*; and the present article consists mainly in contrasting certain species and varieties already published, particularly *S. leucocarpa* Schlecht., *S. pedunculata* Hook., *S. Rusbyi Britt.*, *S. barbigera* Hook., *S. pseudopringlei* Busc. and its variety *fluviatilis* Busc., *S. pseudopedunculata* Busc. and *S. pauciflora* Rose.—*J. M. Greenman.*

353. Cardot, J. **Rosacées nouvelles d'extrême-orient.** [New Rosaceae from the far-east]. Not. Syst. 3: 345–352. 1918.—The following new species and new varieties are described: *Pirus Halliana* Voss. var. *obtusiloba, P. laosensis, P. Pashia* Ham. vars. *obtusata,* and *grandiflora, P. Koehnei* Schneid. var. *crossotocalyx, P. Jacquemontiana* Dcne. var. *longipes, P. granulosa* Bertol. var. *turbinata, P. astateria, P. coronata, P. thibetica, P. hypoglauca, P. glabrescens, P. oligodonta, P. Monbeigii,* and *P. foliosa* (Wall. p. p.) var *subglabra.*—*J. M. Greenman.*

354. Conzatti, Casiano. **Exploracion botanica por la costa meridional de Oaxaca.** [Botanical exploration from Oaxaca to the southern coast.] Bol. Dir. Estud. Biol. 2: 309–325. *Pl. 7.* 1918.—The author gives an account of a botanical expedition from the City of Oaxaca to Puerto Angel on the southern coast of the State of Oaxaca. The article is illustrated by several photographic reproductions and a map showing the itinerary. A list of the plants collected is appended.—*J. M. Greenman.*

355. Gagnepain, F. **Eugenia nouveau d'Indo-Chine.** [New Eugenia from Indo China.] Not. Syst. 3: 321–336. 1918.—The present pages continue from a previous number of the Notulae (*ibid.* 316–320. 1917) the enumeration of new species of *Eugenia* from Indo China. The following species are published as new to science: *Eugenia circumcissa, E. cochinchinensis, E. compongensis, E. Deckerii, E. eburnea, E. Finetti, E. glomerulata, E. Harmandii, E. laosensis, E. laosensis* var. *quocensis, E. leucocarpa, E. mekongensis, E. nigrans, E. pachysarca, E. Pierrei, E. resinosa, E. Tramnion, E. sphaerantha, E. Thorelii, E. tinctoria, E. tonkinensis,* and *E. Zimmermannii* Warburg.—*J. M. Greenman.*

356. Hutchinson, J. **Erlangea aggregata.** Curtis's Bot. Mag. *Pl. 8765.* 1918.—This new species of the Compositae is described and illustrated from specimens grown at the Royal Botanic Gardens, Kew, England. It is a native of Angola, southwestern Africa.—*Adele Lewis Grant.*

357. Jumelle, Henri. **Les Dypsis de Madagascar. [The Dypsis of Madagascar.]** Ann. Mus. Col. Marseille III, 6: 21–38. *Pl. 3.* 1918.—The author presents a synoptical revision of *Dypsis*, a small genus of the Palmaceae. Nineteen species are recognized as occurring in Madagascar, of which the following are published as new: *Dypsis manaranensis*, *D. procera*, *D. littoralis*, *D. angusta*, *D. viridis*, *D. linearis*, *D. pleurisecta*, *D. monostachya*, *D. masoalensis*, *D. fasciculata*, and *D. longipes.*—*J. M. Greenman.*

358. Lecomte, Henri. **Genre nouveau de Sapotacées. [A new genus of the Sapotaceae.]** Not. Syst. 3: 336–345. *Text fig. 2.* 1918.—*LeMonniera* is published as a new genus from Africa. Three species are recognized namely, *LeMonniera ogouensis* (*Mimusops ogouensis* Pierre, *Lecomtedoxa ogouensis* Dubard) from French Congo, *L. clitandrifolia* (*Mimusops clitandrifolia* A. Chev.) from the Ivory Coast, and *L. Batesii* (*Mimusops Batesii* Engl.) from Cameroon.—*J. M. Greenman.*

359. Maiden, J. H. **The forest flora of New South Wales.** Vol. VII. Part 2 [Part LXII of the complete work], pp. 39–75. *Pl. 232–235.* 1918. William Applegate Gullick. Sydney. —The present part contains descriptions, notes, and illustrations of *Brachychiton acerifolius* F. v. M., *Eucalyptus rostrata* Schlecht., *Acacia Mabellae* Maiden, *Callistemon salignus* DC., and *C. brachyandrus* Lindley. A chapter is also included under the caption "Adventitious roots (including notes on stilt-roots, lenticels, pneumataphores; swamp plants)," illustrated by several photographic reproductions.—*J. M. Greenman.*

360. Marloth, Rudolf. **Notes on the genus Mystropetalon Harv. (Balanophoraceae).** South African Jour. Sci. 14: 278–286. *Fig. 1–18.* 1918.—From the study of a series of specimens, the author concludes that there is only one valid species of *Mystropetalon* namely, *M. Thomii* Harv. The other published species, *M. Polemanni* Harv. and *M. Sollyi* Harvey-Gibson, represent two extreme forms and are reduced to synonymy.—*Adele Lewis Grant.*

361. Nelson, J. C. **A new form of Prunella vulgaris.** Amer. Bot. 24: 82–85. 1918.—The author describes a white-flowered form occurring in Oregon, as *Prunella vulgaris* L. var. *calvescens* Fernald forma *alba.*—*Adele Lewis Grant..*

362. Ochoterena, Isaac. **Una nueva especie de Mamillaria. [A new species of Mamillaria.]** Bol. Dir. Estud. Biol. 2: 355–356. *Fig. 1–3.* 1918.—A new species of cactus, *Mamillaria Ocamponis*, is described and figured from Mexico.—*J. M. Greenman.*

363. Pau, C. **Hieracios catalenes. [Hieraciums of Catalonia].** Bol. R. Sc. Española Hist. Nat. 18: 505–507. 1918.—Record is made of several species and varieties of *Hieracium* occurring in northeastern Spain, and two new hybrids are characterized. These have been designated binomially as follows: *Hieracium ortomixtum* (*H. murorum* L. var. × *Neocerinthe* Pau) and *H. abadesicolum* (*H. murorum* L. var. > *Neocerinthe* Pau).—*J. M. Greenman.*

364. Pau, D. Carlos. **Notas sueltas sobre la flora matritense. [Notes on the flora of Madrid].** Bol. Soc. Aragonesa Ciienc Nat. 17: 150–156, 190–197, 208–211. 1918.—The author continues his records on the Spanish flora and gives copious notes. Several new species and varieties are characterized.—*J. M. Greenman.*

365. Rojas Acosta, N. **Addenda ad Floram regionis Chaco australis (pars secunda).** [Additions to the flora of the southern Argentina region.] Bull. Geogr. Bot. 26: 155–165. 1918.—The following new species of vascular cryptogams and seed-plants are described: *Adiantum fossarum*, *Polypodium medicinale*, *Epidryopteris lycopodiomus*, *Lilaea superba*,

Bambusa chacoensis, Aropsis palustris gen. et sp. nov. Aracearum, *Herreria tuberosa, Coryphomia tectorum, Commelina cyanantha, Nidularium hydrophorum, Quesnelina chacoensis, Stenorrhynchum vulnerarium, Ficus speciosus, F. Rojasi* Lévl., *Cecropia ambaci, Momisia spinifera, Sapium Rojasi* Lévl., *Nectandra nigra, Coccoloba corrientina, Petiviera corrientina, Rollinia odoriflora, Bulnesia Gancedoi, Sida Rojasi* Lévl., *Platorheedia pacuri*, and *Lepicochlea americana*.—*J. M. Greenman.*

366. Roldan, Angel. **Los Arboles indigenas que ataca el muerdago en el Valle de Mexico. Datos para la flora forestal del Distrito Federal. [The indigenous trees which are attacked by the mistletoe in the Valley of Mexico. Data for a forest flora of the Federal District].** Mem. Soc. Alzate **37**: 17–21. 1918.—The author discusses some of the facultative parasites occurring on certain trees in the Valley of Mexico. *Phoradendron brachystachyum* Oliv. is found on *Alnus acuminata* HBK. and *P. velutinum* Oliv. attacks *Crataegus, Casimiroa, Fraxinus, Prunus, Quercus*, and *Salix*.—*J. M. Greenman.*

367. Rolfe, R. A. **Angraecum gracilipes.** Curtis's Bot. Mag. *Pl. 8758.* 1918.—A new white-flowered epiphytic orchid, native of Madagascar, is described and illustrated from specimens grown at the Royal Botanic Gardens, Kew, England. It has been confused hitherto with *A. recurvatum* Thouars.—*Adele Lewis Grant.*

368. Rolfe, R. A. **Bulbophyllum sociale.** Curtis's Bot. Mag. *Pl. 8761.* 1918.—*Bulbophyllum sociale* is described and illustrated from specimens grown in the Royal Botanic Gardens, Kew, England. The plant was originally imported from Sumatra.—*Adele Lewis Grant.*

369. Schaffner, John H. **Additions to the catalog of Ohio vascular plants for 1917.** Ohio Jour. Sci. **18**: 99–100. 1918.

370. Smith, J. J. **Die Orchideen von Java. Fünfter Nachtrag. [The orchids of Java. Fifth supplement].** Bull. Jard. Bot. Buitenzorg **26**: 1–135. 1918.—The present article includes descriptions of the following orchids published as new to science: *Nervillea Winckelii, Lecanorchis panciflora, L. multiflora, Oberonia nitidicauda, Microstylis lobatocallosa, M. purpureonervosum, M. cuprea, M. longidens, M. foetida, Liparis angustiflora, Agrostophyllum tenue, Ceratostylis sululata* Bl. var. *flavescens, Dendrobium exsculptum* T. & B. var. *purpureum, D. Jacobsonii, E. tjadasmalangensis, E. Koordersii, Bulbophyllum tjadasmalangense, B. javanicum* (*Epicrianthes javanica* Bl.), *B. scotiifolium, B. peperomiifolium, B. distans, B. Winckelii, B. hamatipes, B. submarmoratum, B. gomphreniflorum, B. rubiferum, Phalaenopsis javanica, Chroniochilus tjidadapensis* gen. et sp. nov., *Sarcochilus fraternus, Thrixspermum roseum, T. batuense* J. J. S. var. *javanicum, Saccolabiopsis Bakhuizenii* gen. et sp. nov., *Saccolabium galbinum, Trichoglottis Winkleri* J. J. S. var. *minor, T. maculata, Sarcanthus flaccidus, Microsaccus affinis, Microtatorchis javanica, M. papillosa, Taeniophyllum proliferum, T. Bakhuizenii, T. radiatum, T. aurantiacum*, and *T. rostellatum*.—*J. M. Greenman.*

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ENTRIES 371-639

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PUBLISHED MONTHLY

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ENTRIES 371-639

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

371. CONNER, S. D. **Soil acidity as affected by moisture conditions of the soil.** Jour. Agric. Res. 15: 321–330. Nov., 1918.—The effect of one-fourth, one-half and full saturation of the soil with water, on the acidity determined by potassium-nitrate and calcium acetate methods. Results show measurable difference in acidity due to different moisture conditions. This paper not primarily ecological but is of value in connection with the distribution of plants on wet or acid soil.—*H. L. Shantz.*

372. DIELS, L. **Das Verhältnis von Rhythmik und Verbreitung bei den Perennen des europäischen Sommerwaldes. [The relation between periodicity and geographic distribution in perennials of European forests.]** Ber. Deutsch. Bot. Ges. 36: 337–351. *5 fig.* Oct., 1918.—Author potted various herbaceous perennials in autumn, transferred them to cool but frost-free glass-houses, and set them in the open in the summer, carrying the experiment over two years. The species exhibited three types of behavior in response to the changed environment. 1. The *Asperula* type includes plants which remain continuously in vegetative activity. The species are chiefly southern in range and belong to prevailingly tropical families. Their usual winter rest is not rhythmic but is a direct result of cold. 2. The *Leucojum* type includes plants which begin their activity in autumn, finish it in spring, and have a summer resting period. They are chiefly of Mediterranean origin, and, while normally rhythmic in their activity, the actual time of the resting period is determined by the environment. 3. The *Polygonatum* type continues to rest during the winter even in the greenhouse, and merely resumes activity earlier in the spring than would occur out of doors. The species are chiefly holarctic in distribution, belonging to extra-tropical families, and their periodicity is in direct correlation with the seasons. Author infers that other types of behavior may also occur.—*H. A. Gleason.*

373. GUPPY, H. B. **Plant distribution from the standpoint of an idealist.** Jour. Bot. 56: 112–113. Apr., 1918.—An appeal is made for coöperation between the supporters of Darwin and DeVries, it being argued that in Mesozoic times mutation was probably the more important mode of evolution, whereas other modes of evolution may now be more important. With the greater mutability in older times we may associate the rise of the great families of angiosperms, while in the more modern times adaptivity has taken a larger place, and with this we may associate the differentiation into species. Families in their distribution largely ignore the cleavage of the lands into two great masses, and thus point back to an epoch of pre-differentiation. The cleavage between the continents, however, is shown in genera and

even more in species, being connected with the more modern epoch of differentiation. The Dicotyledons show greater detachment from the tropics than do Monocotyledons, the Sympetalae standing foremost in regard to such detachment.—*H. C. Cowles.*

374. Harvey, R. B. **Hardening process in plants and developments from frost injury.** Jour. Agric. Res. 15: 83–112. *6 pl., 3 fig.* Oct., 1918.—A review of the literature and a discussion of frost injury. Frost is first indicated in succulent leaves such as cabbage by the withdrawal of water from cells and the displacement of the air in intercellular spaces. Frozen cells of cabbage, *Bryophyllum*, *Salvia* and lettuce show growth stimulus and produce tumors, while tomato, *Coleus* and geranium tissues are killed. In cabbage peroxidase and hydrogen-ion concentration are more pronounced in frozen than in normal cells. Exposure of cabbage to a temperature of +3°C. for five days hardened the plants to such an extent that they were not frozen when subjected to −3°C. for over half an hour. This hardening is due to some changes in the protoplasm, such as increase in hydrogen-ion concentration and salt content, which prevent the precipitation of the protoplasm. The carbohydrate changes accompanying hardening were slight.—The effect of desiccation, freezing and plasmolysis are considered to be similar. [See Bot. Absts. 2, Entry 120.]—*H. L. Shantz.*

375. Jennings, O. E. **Notes on the mosses of northwestern Ontario. I. Sphagnum.** Bryologist 21: 69–78. *Pl. 27, 1 map.* 1918—The first of a series of papers relating to the bryophytes of the northernmost section of the "North Shore" of Lake Superior and a large area of the contiguous interior. Twelve species of *Sphagnum* are recorded, together with copious notes regarding geographic range, local occurrence, and observed ecological relations. [See Bot. Absts. 1, Entry 1418.]—*G. E. Nichols.*

376. MacCaughey, Vaughan. **A survey of Hawaiian coral reefs.** Amer. Nat. 52: 409–438. *9 fig.* June–July, 1918.—There is included in this report a brief consideration of the zonal distribution of the principal marine algae associated with the coral reefs. Species of green, brown and red algae are included, the last being most abundant.—*Geo. D. Fuller.*

377. MacCaughey, Vaughan. **An ecological survey of the Hawaiian pteridophytes.** Jour. Ecol. 6: 199–219. Nov., 1918.—The Hawaiian Islands have 44 genera and 190 recorded species of pteridophytes of which two genera, *Diellia* and *Sadleria*, and 125 species are endemic; 33 species are cosmopolitan, 20 center in the South Pacific and 6 have their chief distribution in America. In the distribution of these plants upon the different islands of the group the author finds evidence in support of the hypothesis that the westward islands are older and have been longer isolated than the eastern. The different species are classified according to the ecological zone in which they occur, their altitudinal ranges are given and the more decidedly hygrophytic, mesophytic and xerophytic forms are grouped. An annotated list of species and a bibliography complete the article.—*Geo. D. Fuller.*

378. Pollock, James B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—See Bot. Absts. 2, Entries 555, 623.

379. Skottsberg, Carl. **Genom Canadas växtgeografiska provinser. [Through Canada's phytogeographic provinces.]** Fauna och Flora 1918: 1–21. *11 fig.* 1918.—This paper presents the impressions gained by the author in a transcontinental trip through Canada. The species are rather fully cited. Among the places visited were forests and flood plains near Ottawa, Stony Mountain at Winnipeg, the Rockies at Banff, Lake Louise, the Kicking Horse River, the Illecillewaet Glacier, and Albert Canyon.—*A. L. Bakke, H. C. Cowles.*

380. Watson, W. **Sphagna, their habitats, adaptations, and associates.** Ann. Bot. 32: 535–551. *5 fig.* Oct., 1918.—This paper is primarily an attempt to demonstrate a correlation between the morphological and ecological characters of the sphagnums. The sphagnums

possess various structural peculiarities which may seem to be of a xerophytic nature. The characters specified as such are compactness of habit, imbrications of leaves, concave leaves with hooded or inrolled apical portions, formation of capillary chambers along which water passes, papillosity of the cell wall, intermixture of dead empty cells with living chlorophyllous ones, and presence of reservoirs that serve to store water. These peculiarities are variously developed in different groups of sphagnum, but an attempt to make a comparative correlation between the structure of different plants and the wetness of their habitats leads to inconsistencies and anomalies. Other factors than the degree of wetness influence the distribution of the sphagnums, and the most important of these is the acidity of the water with which they are in contact. The sphagnums obtain their mineral salts from very dilute solutions. They apparently possess a special method of mineral nutrition by which the base of a salt is absorbed and the acid liberated. Various of the apparently xerophytic structural devices are thought to be correlated primarily with this peculiar method of nutrition. During periods of drought, when absorption by exposed plants is suspended, the xerophytic devices act as such, keeping the plant in a moist condition until a further supply of dilute solution is available. [See Bot. Absts. 2, Entry 334.]—*G. E. Nichols.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

381. HILTON, HUBER C. **Furrow planting upon the sand plains of Michigan.** Jour. Forestry 16: 915–919. December, 1918.—Furrow planting under ordinary weather conditions has been a success with Norway pine 2–0 and 2–1 stock at a cost of from $2.00 to $2.40 an acre. Survivals of from 87 to 96 per cent are secured, as even under unfavorable weather conditions the trees, being below the level of the surrounding soil cover, can better withstand a period of drought. The furrows also serve as fire guards and can remain unplanted for two years, as no vegetation comes in during that time and there is no erosion.—*E. N. Munns.*

382. PEARSON, G. A. **The relation between spring precipitation and height growth of western yellow pine saplings in Arizona.** Jour. Forestry 16: 677–689. *3 fig.* Oct., 1918.—Western yellow pine in northern Arizona makes its height growth during the period of lowest precipitation in the year. During this period of great activity the trees are dependent almost entirely upon moisture stored in the soil since the preceding winter and spring. Normally the great bulk, and in some years all, of this moisture is accumulated during the winter months, December-March. When winter precipitation constitutes the sole supply, height growth in young saplings is apt to be small. If winter precipitation is supplemented by 2 inches or more in April and May (the rainfall in June is rarely sufficient to be of any consequence), a pronounced stimulus to height growth results. It may be stated as a general rule for the sites covered by this study, that 2 inches or more of precipitation between April 1 and May 31 is several times as effective as the same amount in excess of the normal precipitation between December 1 and March 31. Factors reflecting atmospheric conditions between April 1 and June 30, including evaporation, wind movement, relative humidity, cloudiness, and length of rainless period, show a close, though not entirely consistent, relation to height growth. Temperature on the sites studied appears to be important only in so far as it affects moisture conditions. Since rise in temperature results in increased water consumption, height growth varies inversely with temperature when, as is usually the case, there is a shortage of moisture. Observations indicate that where moisture is abundant, height growth increases directly with higher temperature.—*G. A. Pearson.*

383. LINN, EDWARD R. **Silvical systems in spruce in northern New Hampshire.** Jour. Forestry 16: 897–908. December, 1918.—Conditions in old cuttings in the hardwood type, spruce-slope type and spruce-flat type are described, where the cuttings were made by different methods of the diameter limit and clean cutting. The defects of the rigid diameter limit and how to secure reproduction are discussed, and it appears that clean cutting, if carefully done, may lead to better reproduction than is commonly supposed.—*E. N. Munns.*

384. Singh, Puran. **A note on the economic value of the Chinese tallow tree (*Sapium sebiferum*).** Indian Forester 44: 383–388. Sept., 1918. The tallow tree may become an important source of vegetable tallow and drying oil. These products should be manufactured with the aid of solvent extraction, for the yield by the steaming process is 50 per cent less than by the solvent method. There is a very small amount of dye-principle in the leaves but not enough to warrant extraction. Due to the presence of ammonia, the leaves should be a valuable fertilizer.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

385. Anonymous. **A cross between a raspberry and a dewberry.** Jour. Heredity 9: Frontispiece. *1 fig.* Dec., 1918. Illustration of hybrid from *Rubus rubiesetus* (dewberry) ♀ × *R. strigosus* (red raspberry) ♂, made by H. Ness, Texas Agric. Exp. Sta. F_1 gave 280 uniform plants but only 5 fully fertile. 1000 F_2 plants appear uniform and similar to parents. Fruit is dark red to nearly black. Flavor suggests raspberry, very superior to blackberry. —*Merle C. Coulter.*

386. Banta, Arthur M. **The extent of the occurrence of sex intergrades in Cladocera.** Anat. Rec. 15: 355–356. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918.]—Sex intergrade strains of *Simocephalus vetulus* have been reared in the laboratory for three years (65 generations). These all came from the offspring of a single individual. Notwithstanding careful microscopic examination of thousands of individuals of all the laboratory strains (15) of this species, particularly during the last twenty months, no other sex intergrades have been found either in the strain which produced them originally or in any of the other strains of *Simocephalus*.—About twenty months ago sex intergrades were found in one of the strains of *Daphnia longispina* and from these we have propagated sex intergrade strains for some 36 generations. During the next few months sex intergrades were found (sparingly and only after the microscopic examination of thousands of individuals) in all except one of the six strains of this species under cultivation. Sex intergrade strains derived from three distinct strains of this species are being propagated. Two or three sex intergrades were also seen in a strain of this species in 1915 but no young were secured from them.—Long and continued search of great numbers of individuals of 18 strains of *Daphnia pulex*, 7 strains of *Simocephalus serrulatus*, and of 11 strains of three species of *Moina* has not revealed a single sex-intergrade individual. Hence in these species as well as in *Simocephalus vetulus* the occurrence of sex intergrades is apparently a rare phenomenon. Sex intergrades are relatively rare in *Daphnia longispina* as well, although laborious search has revealed them, mostly a single individual to a strain, in five of six strains. Once established, however, intergrade strains continue indefinitely the production of sex intergrades.—In the literature there is, presumably, only a single mention of the finding of sex intergrades (R. de La Vaulx). In view of the large number of workers with *Cladocera* and the extensive experimental work on this material the fact that there has been apparently only a single occurrence of sex intergrades in other laboratories speaks further for the restricted occurrence of these interesting sex forms.—*A. M. Banta.*

387. Baur, E. Rev. of: H. W. Siemens. **Biologische Terminologie und rassenhygienische Propaganda. (Biological terminology and eugenical propaganda.)** Arch. Rass. Ges. Biol. 1917: 257. 1917.] Zeitschr. Abstamm. Vererb. 19: 311–312. Aug., 1918.—Siemens has proposed a logical nomenclature to supplant the more or less confused terminology which has grown up in genetical literature. Reviewer thinks that owing to shifting conceptions it is better to retain the present terminology with shifting significance of terms. He especially objects to substitution of "idiophor" for "gene."—*G. H. Shull.*

388. Baur, E. [Rev. of: H. W. Siemens. **Die biologischen Grundlagen der Rassenhygiene und der Bevölkerungspolitik. (The biological principles of race hygiene and of eugen-**

ical policy.) *8vo, 80 p., 8 fig.* J. F. Lehmann: München. 1917.] Zeitschr. Abstamm. Vererb. 19: 312. Aug., 1918.—Reviewer considers this popular presentation important in view of lack of biological training among physicians, sociologists and social workers. Author uses his new terminology. [See next preceding Entry, 387.], but gives also synonymy with current terminology. All technical expressions are, throughout, very well "verdeutscht."—*Geo. H. Shull.*

389. BAUR, E. [Rev. of: ZADE, A. **Der Hafer. Eine Monographie auf wissenschaftlicher und praktischer Grundlage. (Oats. A monograph on scientific and practical principles.)** *8vo, 355 p., 32 fig.* Fischer: Jena, 1918. (See Bot. Absts. 2, Entry 467.)] Zeitschr. Abstamm. Vererb. 20: 52–53. Sept., 1918.

390. BROTHERTON, W. E. **Note on inheritance in Phaseolus.** Ann. Rept. Michigan Acad. Sci. 20: (1918): 152. 1919.

391. CASTLE, W. E. **Is the arrangement of the genes in the chromosome linear?** Proc. National Acad. Sci. U. S. Amer. 5: 25–32. *2 fig., 1 diagram.* Feb., 1919.—See Bot. Absts. 2, Entry 658.

392. CASTLE, W. E. **The linkage system of eight sex-linked characters of Drosophila virilis (data of Metz).** Proc. National Acad. Sci. U. S. Amer. 5: 32–36. *Fig. 3–4.* Feb., 1919.—See Bot. Absts. 2, Entry 659,

393. COBB, FRIEDA. **A case of Mendelian segregation in Oenothera pratincola.** Ann. Rept. Michigan Acad. Sci. 20 (1918): 151. 1919.

394. C[OLE], L. J. **A laboratory manual for genetics.** [Rev. of: BABCOCK, E. B., AND J. L. COLLINS. **Genetics laboratory manual.** First edition. *xi + 56 p.* McGraw-Hill Book Co. Inc.: New York, 1918.] Jour. Heredity 10: 39–40. Jan., 1919.

395. COULTER, JOHN M., AND MERLE C. COULTER. **Plant genetics.** *19 × 13 cm., ix + 214 p., 40 fig.* Univ. Chicago Press: Chicago. July, 1918.—Authors state book is neither technical presentation of genetics nor general text, but course of general lectures adapted to initiate young botanists into point of view of working geneticists. Discusses theories of Darwin, Weismann, and deVries; inheritance of acquired characters; Mendel's laws; "neo-Mendelism," including presence and absence hypothesis, factor hypothesis, blends, inheritance of quantitative characters, practical aspect of cumulative factor hypothesis, linkage and crossing-over. So-called non-Mendelian inheritance and somatic segregation are also considered. Experiments of Castle and Jennings are cited in reference to modification of unit characters. Briefly considers investigations of sex phenomena in algae, fungi, liver-worts, mosses and seed plants, as well as physiological and chromosome theories of sex determination; evidence from cytology and breeding for and against chromosomes as bearers of hereditary factors. Parthenogenesis and vegetative apogamy are considered in regard to bearing on genetical experiments. Points out advantages of lower plants as material for genetical experiments because (1) in them reproductive phenomena are not obscured by so many complexities; (2) would test theories of inheritance derived from study of sporophyte involving theoretical mechanism for segregation of factors. Chapters on self sterility and endosperm in inheritance. Favors view that semi-sterility may be due to Mendelian factor. [See Bot. Absts. 1, Entry 1471.]—*E. E. Barker.*

396. COULTER, JOHN M. **Embryo sac and fertilization in Oenothera.** [Rev. of: ISHIKAWA, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. 1918. (See Bot. Absts. 1, Entries 482, 979, 980.)] Bot. Gaz. 67: 275–276. Mar., 1919.

397. COULTER, MERLE C. **Breeding for disease resistance.** [Rev of: (1) EVANS, I. B. P. **South African cereal rusts with observations on the problem of breeding rust resistant wheats.** Jour. Agric. Sci. 4: 95–104. 1911. (2) STAKMAN, E. C., JOHN H. PARKER, and F. J. PIEMEISEL.

Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance? Jour. Agric. Res. 14: 111–123. *Pl. 13–17.* 1918. (See Bot. Absts. 1, Entry 500).] Bot. Gaz. 67: 273. Mar., 1919.

398. De Vries, Hugo. **Oenothera rubrinervis, a half mutant.** Bot. Gaz. 67: 1–26. Jan., 1919.—*Oenothera rubrinervis* (a "half mutant" from *Oe. Lamarckiana*, produced by combination of mutated gamete with normal *velutina* gamete) when self-fertilized produces in every generation about one-fourth empty seeds, "mass mutation" of about one-fourth double mutants (*O. deserens*, which breeds true and produces no empty seeds), and one-half *O. rubrinervis*, which repeats splitting. Author concludes *deserens* is repetition of initial mutation which produced *rubrinervis* from *Lamarckiana*. According to author's view *Lamarckiana* produces two kinds of gametes, in consequence of secondary mutability into *velutina*, the *velutina* being linked to lethal factor which kills it in young seeds. Assuming that mutation into *deserens* occurred in typical gametes, leaving *velutina* unchanged, *rubrinervis*, like *Lamarckiana*, must have two types of gametes, both of them in a mutated condition—*deserens* without a lethal factor, and *velutina* with one. In self-fertilization of *rubrinervis*, copulations of *deserens* gametes among themselves produce *deserens*, *velutina* among themselves give empty seeds, and combinations of the two types of gametes give *rubrinervis* with its splitting capacity. Proof of above conception is given by results of self-fertilizations and crosses.—*Oe. oblonga* is mutation analogous to *rubrinervis*, arising through mutation of normal *Lamarckiana* gametes, leaving *velutina* gametes unchanged, but mutated gametes must be assumed to be suppressed in its pollen. *Oe. nanella* seems to arise through mutations in *velutina* gametes of *Lamarckiana*. [See Bot. Absts. 1, Entry 1478.]—*Frieda Cobb.*

399. Ellinger, Tage. [Rev. of: Jennings, H. S. **The numerical results of diverse systems of breeding.** Genetics 1: 53–89. 1916. Zeitschr. Abstamm. Vererb. 19: 205. June, 1918.

400. Federley, Harry. [Rev. of: (1) Metz, Charles W. **Chromosome studies on the Diptera. 2. The paired association of chromosomes in the Diptera and its significance.** Jour. Exp. Zoöl. 21: 280. *8 pl.* 1916. (2) Idem. [Same general title.] **3. Additional types of chromosome groups in the Drosophilidas.** Amer. Nat. 50: 587–599. *1 pl.* 1916.] Zeitschr. Abstamm. Vererb. 19: 211–213. June, 1918.

401. Federley, Harry. [Rev. of: Punnett, Reginald Crundall. **Mimicry in butterflies.** *188 p., 16 pl.* Cambridge Univ. Press: Cambridge, England, 1915.] Zeitschr. Abstamm. Vererb. 19: 213–215. June, 1918.

402. Franz, V. [Rev. of: Haecker, Valentin. **Über eine entwicklungsgeschichtlich begründete Vererbungsregel.** (On a law of inheritance based on embryology.) Mitteil. Naturforsch. Ges. 4. 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 93–95. 1918.

403. Franz, V. [Rev. of: Haecker, Valentin. **Zur Eigenschaftsanalyse der Wirbeltierzeichnung.** (Analysis of the distinctive color markings of vertebrates.) Biol. Zentralbl. 36: 448–471. 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 93–95. 1918.

404. Freudenberg, Richard. [Rev. of: Roemer, Th.] **Über die Befruchtungsverhältnisse verschiedener Formen des Gartenkohles (Brassica Oleracea L.) (On the fertilization relationship of different forms of garden cabbage—Brassica oleracea L.)** Zeitschr. Pflanzenzücht. 4: 125–141.] Zeitschr. Abstamm. Vererb. 19: 222–223. June, 1918.

405. Ghigi, Alessandro. **Ricerche sull' incrociamento del Gallus sonnerati con polli domestici.** Mem. R. Acc. Bologna 8^{III}: 1–16. *1 pl.* Abstract from Ibis 1: 134. Jan., 1919. —"In this memoir Professor Ghigi states the results of his experiments in crossing the two species of Jungle-Fowl *Gallus sonnerati* and *G. gallus* and also various members of the domes-

tic races. All of these he finds completely fertile with one another through several generations. From this he deduces the conclusion that our domestic races are not, as has been believed by Charles Darwin and many other writers, monogenetic and descended solely from *Gallus gallus* (= *G. bankiva* auct.), but that they are bigenetic and have been derived from both *G. gallus* and *G. sonnerati*.—Details of the hybrids and of their Mendelian inheritance are given, and the plate illustrates the feather-characters of the pure strains and of the various crosses."

406. GOEDEWAAGEN, M. A. J. [Rev. of: F. BACO. **Variations d'un hybride sexual de vigne par sa greffe sur l'un de ses procréateurs. (Variations of a sexual hybrid of the grape, when grafted onto one of its parents.)** Compt. Rend. Acad. Sci. Paris 163: 712–714. Jan., 1916.] Genetica 1: 98. Jan., 1919.

407. GOEDEWAAGEN, M. A. J. [Rev. of: L. DANIEL. **Influence de la greffe sur les produits d'adaptation des Cactées. (Influence of grafting on the adaptive products of the Cactaceae.)** Compt. Rend. Acad. Sci. Paris 164: 318–323. 1917.] Genetica 1: 106. Jan., 1919.

408. GRAEVENITZ, V. [Rev. of: KAJANUS. **Zur Genetik der Samen von Phaseolus vulgaris. (Genetics of the seed of Phaseolus vulgaris.)** Zeitschr. Pflanzenzücht. 2: 378–388. 1913.] Zeitschr. Abstamm. Vererb. 20: 60. Sept., 1918.

409. GRAEVENITZ, V. [Rev. of: FROST, HOWARD B. **The inheritance of doubleness in Matthiola and Petunia I. The hypothesis.** Amer. Nat. 49: 623–635. 1915.] Zeitschr. Abstamm. Vererb. 20: 56–57. Sept., 1918.

410. HANCE, ROBERT T. **Variations in the number of somatic chromosomes in Oenothera scintillans de Vries.** Genetics 3: 225–275. *5 fig., 7 pl.* May, 1918.—Somatic cells contain from 15 to 21 chromosomes, the higher numbers resulting chiefly from fragmentation of some of larger of the 15 fundamental chromosomes of the species. Special methods of measurement were developed which showed typically series of 7 pairs and one unpaired chromosome. A member of a pair differs from one of next shorter pair by about 9 per cent of its length. Fragments were smaller than unpaired chromosome which is shortest of the 15 chromosomes in the fundamental group and it was possible to associate fragments with the chromosomes from which they were derived. The sum of length of chromosomes is same whether number be 15 or more. Fragmentation was not observed in cells of germinal line. Two classes of gametes are developed possessing respectively 7 and 8 chromosomes, the unpaired chromosome passing to one of the poles at reduction division. Same relative length relations exist between chromosomes of haploid group as between pairs of diploid group. Total chromosome length in the 8-chromosome gametes differs from that of 7-chromosome gamete by length of the additional unpaired chromosome. Characters of *Oe. scintillans* are associated with the unpaired chromosome since union of two 7-chromosome gametes gives *Lamarckiana* with 14 chromosomes. A type resembling *oblonga* is thrown by *scintillans* in addition to *Lamarckiana* and it is suggested that this plant may be result of union of two 8-chromosome gametes, giving zygote with 16 chromosomes.—*B. M. Davis.*

411. HERIBERT-NILSSON, NILS. **Experimentelle Studien über Variabilität, Spaltung, Artbildung and Evolution in der Gattung Salix. [Experimental studies on variability, segregation, speciation and evolution in the genus Salix.** Lunds Universitets Årsskrift N. F. (Afd. 2) 14 (No. 28): 1–145. *65 fig.* 1918.

412. HERIBERT-NILSSON, N. [Rev. of: KLEBAHN, H. **Formen, Mutationen und Kreuzungen bei einigen Onotheren aus der Lüneburg Heide. (Forms, mutations and crosses in several Oenotheras from the Lüneburg heath.)** Jahr. Hamburg Wiss. Anstalt 31: 1–64. *1 pl.* 1913.] Zeitschr. Abstamm. Vererb. 20: 46–48. Sept., 1918.

413. HERIBERT-NILSSON, N. [Rev. of: NILSSON-EHLE, H. **Hveteförädlingen för Svealand. (Wheat improvement for Svealand.)** Sveriges Utsädesfören. Tidskr. 26: 5–23. 1916.] Zeitschr. Abstamm. Vererb. 20: 50. Sept., 1918.

414. Holmes, S. J., and C. M. Doud. **The approaching extinction of the Mayflower descendants.** Jour. Heredity 9: 296–300, 335. Nov., 1918.—Review of biographical study of Mayflower families and of special study made by the California branch of the Society of Mayflower Descendants. Study shows steady decline in size of Mayflower families. Genealogy of the Brewster family is analyzed. Decline in family size has been especially rapid during last fifty years. Suggested that Society of Mayflower Descendants consider means of conserving their stock. [See Bot. Absts. 1, Entry 1511.]—*H. H. Laughlin.*

415. Hyde, Roscoe R. **Correlation of fertility and fecundity in an inbred stock.** Anat. Rec. 15: 355. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918.]—Over 95 per cent of the eggs isolated from a mating of the wild *Drosophila ampelophila* gave rise to mature flies. On inbreeding the fertility rapidly declined. The fecundity of the female was not affected in this way. The correlation between the number of eggs which a female lays and the percentage which gave rise to mature flies is very low. This would seem to indicate that the sterility as it affects the female bears no causal relation to reduced fertility.—*R. R. Hyde.*

416. Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. April, 1918.—See Bot. Absts. 1, Entries 482, 979, 980. [Rev. in Bot. Gaz. 67: 275, 276. Mar., 1919.]

417. Isserlis, L. **On a formula for the product-moment coefficient of any order of a normal frequency distribution in any number of variables.** Biometrika 12: 134–139. Nov., 1918. —For a frequency distribution involving two variables, reduced product moment is correlation coefficient. Present author proves in Biometrika 12, Part III that in case of a normal distribution in four variables, the product moment is sum of products of correlation coefficients two at a time. Present paper generalizes this result for any even number of variables: reduced product moment is sum of products of correlation coefficients, each term involving all variables. As important special cases, values of mixed moment coefficients of any order in each variable can be deduced.—*R. B. Robbins.*

418. Isserlis, L. **Formulae for determining the mean values of products of deviation of mixed moment coefficients in two to eight variables in samples taken from a limited population.** Biometrika 12: 183–184. Nov., 1918.—Gives formulae for expected deviation of product moments in many samples of given size from mean of product moments, in terms of the observed product moments, total number of individuals and number in samples. [See Bot. Absts. 1, Entry 1515.]—*R. B. Robbins.*

419. Lenz, F. [Rev. of: Federley, Harry. **Die Vererbung des Raupendimorphismus von Chaerocampa elpenor L. (The inheritance of the pupal dimorphism of Chaerocampa elpenor L.)** Öfversigt af Finska Vetenskaps-Soc. Förhandl. 58: 13. 1915–16.] Zeitschr. Abstamm. Vererb. 19: 215–216. June, 1918.

420. Love, H. H., and G. P. McRostie. **The inheritance of hulllessness in oat hybrids.** Amer. Nat. 53: 5–32. *7 fig.* Jan.-Feb., 1919.—Crosses between hullless oats (*Avena nuda*) and hulled varieties were studied. Hullless forms differ from hulled in three important characters: 1. Kernel is loose or free within hull; 2. Rachillae of three- to many-grained spikelet are so elongated that uppermost grains are borne above the empty glumes; 3. Glumes and lemmas are similar in texture.—F_1 types were intermediate in that both types of kernels hulled and hullless, are formed on same plant. Type of panicle resembles hullless parent more than hulled. There are, however, fewer hulled than hullless kernels on F_1 panicles.—Although F_2 ratios deviate from 3:1 they indicate that this character behaves as simple monohybrid. In F_3 pure hulled and hullless plants bred true, while intermediate types gave approximately 1 hulled: 2 intermediate: 1 hullless. Percentage of hulled kernels on heterozygous F_3 plants varied from about 3 to more than 90. Thus, while the usual 1: 2: 1 ratio obtained, some factor

or factors seemed to affect heterozygous forms so as to modify amount of hulled or hullless kernels present. Some of the work was therefore continued (beyond F_3) in attempt to answer in general two questions: 1. Does percentage of hulled plants obtained from any heterozygous parent vary with percentage of hulled kernels possessed by that parent? 2. Do hulled and hullless kernels of heterozygous plant give approximately same results in their offspring? Some families did not give ratios close to 1:2:1, and those plants having high percentage of hullless kernels tended to produce relatively high number of hullless plants. Thus degree of hulllessness as expressed by percentage may influence segregation in following generations. Percentage of hulled kernels on parent form influences amount of hulled condition in heterozygous offspring. Average percentage of offspring agrees closely with that of parent forms. —In order to answer second question, seed of F_3 heterozygous plants were separated into two lots, hulled and hullless, and planted separately, and their segregation ratios separately determined. In *both* cases results agreed closely with 1:2:1 expectation, and there was no evident relation between kind of kernel (hulled or hullless) sown from a heterozygous plant, and offspring produced.—There is some reason for assuming the case to be one of multiple factors in which one primary factor pair determines hulled or hullless condition, and other factors influence hulled condition of those plants *only* that are heterozygous for the primary factors. However, condition of F_1 plants is not in agreement with such hypothesis, for all F_1 plants observed contained fewer-hulled kernels than hullless. Results of different series are rather conflicting and it does not seem possible at present to explain all of them on simple multiple factor hypothesis. It is thought there may be some combinations which have tendency to produce an excess of hullless kernels, thus influencing type of distribution.—*John H. Parker.*

421. MACCARDY, H. M. **Nuclear reorganization and its relation to conjugation and inheritance in Arcella vulgaris.** Anat. Rec. 15: 356–357. Jan. 20, 1919. [Author's abstract of paper read before American Society of Zoologists, Baltimore, December 27, 1918.]—The data from pedigreed cultures of *Arcella vulgaris* maintained from September, 1917, to August, 1918, have given the following conclusions: 1. A given individual produces a limited number of daughter cells. The number varies from none to twenty-seven (the highest found). 2. These daughter cells and in turn their offspring behave in a similar way with the exceptions indicated. 3. After a period of fairly regular successive vegetative divisions, a period of "depression" occurs. Some of the features marking this period are: reduced activity (feeding, locomotion, division), "punctate" shells, "empty" shells, increased mortality. These are incidental, not essential. 4. Individuals passing successfully through this period may give rise to a new line unlike that from which it came—a marked change in size, for example. This is a "mutation." On the other hand, the new may be like the old line. A new period of vegetative divisions sets in and continues until another period of depression is reached. 5. While some members of a line are "depressed," others conjugate. 6. In pedigreed cultures of exconjugants the two members of the pair tend to produce the same numbers of daughter cells. This is in agreement with the fission rate of exconjugants in Paramoecia (Jennings). 7. In lines derived from exconjugants, after a period of vegetative divisions, individuals pass again into another period of depression, when the changes noted above and (or) conjugation may be repeated. 8. Preparations of cells made during "depression," and of conjugating cells show remarkably similar conditions of both chromidial net and nuclei. Old nuclei are broken up and new nuclei are formed. This is the period of nuclear reorganization. This may occur within a single individual or through conjugation of two individuals. (In both permanent and temporary mounts.) 9. The inheritance of size shows changes at these periods in individual lines. 10. The following modifying factors should be mentioned: Cultural conditions influence the procedure—unfavorable conditions appear to hasten "depression" and very favorable conditions to delay it. The different nuclei do not always divide at the same time or pass through similar stages together. There is also evidence to show that the essential change may occur with no great break in the usual course of events, and the new arise almost or quite imperceptibly.—*H. M. McCardy.*

422. MacInnes, L. T. **The testing of pure-bred cows in New South Wales.** Jour. Heredity 9: 307–335. Nov., 1918.—Traits of milk and butter-fat production are hereditary. Author's effort during four years of testing to define these traits in families has brought encouraging results. Tables indicate increased productiveness of 20 per cent in butter and 25.5 per cent in milk.—*R. K. Nabours.*

423. Morgan, T. H. **Several ways in which gynandromorphism in insects may arise.** Anat. Rec. 15: 357. Jan. 20, 1919.—[Author's abstract of paper read before American Society of Zoologists, Baltimore, December 27, 1918.]—Gynandromorphs have appeared in *Drosophila* 3 times in 16,637 flies; 32 times in 42,409; 2 times in 4,979 and 3 in 24,000; thus in the ratio of 1 to 2200. There is evidence that nearly all of them start as females; 19 were more female than male; 14 were half male and half female; and 6 were more male than female. Practically all the cases found are demonstrably due to elimination of one sex-chromosome soon after fertilization. A few call for other chromosomal relations. Rarely one may even have begun as a male, but nearly all cases supposed at first to belong to this category have proved to be due to mutation in the sex-chromosome. All cases of hybrid gynandromorphs found in bees can also be explained by the theory of chromosomal elimination. A few cases in *Drosophila* seem to be explicable only on the assumption of a bi-nucleated egg, and this explanation is the only one found so far that will give a consistent explanation of Toyama's two gynandromorphs in the silkworm moth. Bi-nucleated eggs have been described by Doncaster in other moths.—*T. H. Morgan.*

424. Newman, C. C., and L. A. Leonian. **Irish potato breeding.** South Carolina Agric. Exp. Sta. Bull. 195. *28 p., 19 fig.* 1918.—See Bot. Absts. 2, Entry 693.

425. Ostenfeld, C. H. [Rev. of: Lotsy, J. P. **Evolution by means of hybridization.** Nijhoff: s'Gravenhage. 1916. Zeitschr. Abstamm. Vererb. 20: 42–45. Sept. 1918.

426. Ostenfeld, C. H. [Rev. of: Lotsy, J. P. **La quintessence de la théorie du croisement. (The quintessence of the theory of crossing.)** Arch. Néerland. 3: 351–353. 1917. (See Bot. Absts. 2, 439.)] Zeitschr. Abstamm. Vererb. 20: 46. Sept., 1918.

427. Rasmuson, H. [Rev. of: Rosen, D. **Zur Theorie des Mendelismus. 1. Über scheinbare Koppelungs- und Abstossungsphänomene bei gewissen polymeren Spaltungen. 2. Über den analytischen Wert von Rückkreuzungen. (To the theory of Mendelism. 1. On apparent coupling and repulsion-phenomena in certain polymeric segregations. 2. On the analytical value of back crossing.)** Bot. Notiser 1916: 289–298. 1916.] Zeitschr. Abstamm. Vererb. 19: 207. June, 1918.

428. Scheppegrell, William. **Susceptibility to hay fever, and its relation to heredity, age, and seasons.** U. S. Public Health Rep. 1918: 1191–1196. July 19, 1918.—Since pollens causing hay fever are inhaled by all within their radius, but only 1 per cent of population are affected, it would seem that those subject have idiosyncrasy making them susceptible. Investigation of 415 cases showed that 36.5 per cent had relatives of first degree (father, mother, brother, sister) who also suffered from hay fever.—*J. P. Kelly.*

429. Schiemann, E. [Rev. of: Malinowski, E. **Über die durch Kreuzung hervorgerufene Vielförmigkeit beim Weizen. (On the variability of wheat induced by crossing)** Extrait Compt. Rend. Soc. Sci. Varsovie 9: 733–756. 1916.] Zeitschr. Abstamm. Vererb. 19: 219. June, 1918.

430. Schiemann, E. [Rev. of: Lehmann, E. **Bakterienmutationen Allogonie. Klonumbildungen. (Mutations in Bacteria. Allogony. Clone formation.)** Centralbl. Bakt. Parasit. 1916: 289–300. 1916.] Zeitschr. Abstamm. Vererb. 20: 60–61. Sept., 1918.

431. Schiemann, E. [Rev. of: Revis, C. **Variation in Bacterium coli.** Proc. Roy. Soc. London 86: 373–376. 1913.] Zeitschr. Abstamm. Vererb. 20: 61–62. Sept., 1918.

432. Schiemann, E. [Rev. of: Simon, J. **Über die Verwandtschaftsverhältnisse der Leguminosen-Wurzelbakterien. (On the relationships among the root-nodule Bacteria of the Leguminosae.)** Centralbl. Bakt. Parasit. 1914: 470–479. 1914.] Zeitschr. Abstamm. Vererb. 20: 62–63. Sept., 1918.

433. Schouten, S. L. [Dutch Rev. of: Beyerinck, M. W. **De enzymtheorie van de erfelijkheid. (The enzyme theory of heredity.)** Versl. gew. Verg. K. Akad. Wet. (Wis. Natuurk.) Amsterdam 25: 1231–1245. 1917.] Genetica 1: 98–100. Jan., 1919.

434. Siemens, Herman W. [Rev. of: Lenz, Dr. Fritz. **Eine Erklärung des Schwankens der Knabenziffer. (An explanation of the decrease in number of boys.)** Arch. Rassen- u. Gesellschaftsbiol. 11: 629. 1914–15.] Zeitschr. Abstamm. Vererb. 19: 208–209. June, 1918.—See Bot. Absts. 2, Entry 48.

435. Sirks, M. J. **De kritische punten van het evolutievraagstuk. [Critical points of the evolution hypothesis.]** Genetica 1: 70–91. Jan., 1919.

436. Sirks, M. J. [Rev. of: Gates, R. R. **Heredity and mutation as cell phenomena.** Amer. Jour. Bot. 2: 519–528. 1915.] Zeitschr. Abstamm. Vererb. 19: 203–204. June, 1918.

437. Sirks, M. J. [Rev. of: Honing, J. A. **Variabiliteit der bastardsplitsing.—Variabilität der Bastardspaltung. (Variability of hybrid splitting.)** Versl. gew. verg. K. Akad. Wet. (Wis. Natuurk.) Amsterdam 25: 794–804. Nov., 1916.] Zeitschr. Abstamm. Vererb. 19: 204–205. June, 1918.

438. Sirks, M. J. [Rev. of: Lotsy, J. P. **Over Oenothera Lamarckiana als type van een nieuwe groep van organismen, die der Kernchimären, benevens beschouwingen over de waarde der genenhypothese in de erfelykheids- en evolutieleer. Über Oenothera Lamarckiana als Typus einer neuen Gruppe von Organismen, derjenigen der Kernchimären, nebst Betrachtungen über den Wert der Genenhypothese in der Vererbungs- und Evolutionslehre. [On Oenothera Lamarckiana as type of a new group of organisms, that of the nuclear chimeras, and speculations concerning the value of the genotype hypothesis in the study of heredity and evolution.** *52 p., 2 pl.* Nyjhoff: s'Gravenhage. 1917.] Zeitschr. Abstamm. Vererb. 20: 48–49. Sept., 1918.

439. Sirks, M. J. [Rev. of: (1) Lotsy, J. P. **La quintessence de la théorie du croisement. (The quintessence of the theory of crossing.)** Arch. Néerland. Sci. 3: 351–353. 1917. (See Bot. Absts. 2, Entry 426.) (2) Idem. **L'Oenothera de Lamarck (Oenothera Lamarckiana de Vries) considérée comme chiméra nucléaire. (Lamarck's Oenothera (Oenothera Lamarckiana de Vries) considered as a nuclear chimera.)** Arch. Néerland. Sci. 3: 324–350. 1917.] Zeitschr. Abstamm. Vererb. 20: 49–50. Sept., 1918.

440. Sirks, M. J. [Rev. of: Mayer-Gmelin, H. **De kruising van roode ongebaarde spelt met fluweelkaf Essex-tarwe, een voorbeeld van Factoren-analyse.—Die Bastardierung von rotem unbegranntem Spelz mit Essexsammetweizen, ein Beispieleiner Faktorenanalyse. (Crossing of a red unbearded spelt with velvet-chaff Essex wheat, an example of factorial analysis.)** Cultura 29: 141–159. *2 pl.*] Zeitschr. Abstamm. Vererb. 20: 51. Sept., 1918.

441. Sirks, M. J. [Rev. of: Lotsy, J. P. **Het verband tusschen onze opvatting omtrent het ontstaan der sorten en wetenschappelyke teelt.—Die Beziehungen zwischen unserer Auffassung der Artentstehung und wissenschaftlicher Züchtung. (The relation between our conception of the origin of species and scientific breeding.)** Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 7: 1–33. *2 pl.* 1917. Zeitschr. Abstamm. Vererb. 20: 53. Sept., 1918.

442. Sirks, M. J. [Rev. of: Tjebbes, K. **De veredeling van de suikerbiet. (Zuckerrübenzüchtung). (Improvement of the sugar beet.)** Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 8: 1–28. *6 fig.* 1917.] Zeitschr. Abstamm. Vererb. 20: 53–54. Sept., 1918.

443. Sirks, M. J. [Rev. of: Sirks, M. J. **Stérilité, auto-inconceptibilité et differentiation sexuelle physiologique.—Sterilität, Selbstunempfänglichkeit und physiologische Geschlechtsdifferentiation. (Sterility, self-incompatibility and physiological differentiation of the sexes.)** Arch. Néerland. Sci. 3: 205–234. 1917.] Zeitschr. Abstamm. Vererb. 20: 58–59. Sept., 1918.

444. Sirks, M. J. [Rev. of: Reese, A. N. **Variations in the vermilion spotted newt, Diemyctylus virescens.** Amer. Nat. 50: 316–320. 1916.] Zeitschr. Abstamm. Vererb. 20: 63. Sept., 1918.

445. Sirks, M. J. [Rev. of: Kroon, H. M. **De kruisingen in de huistierteelt in Nederland, getoest aan de tegenwoordige begrippen over erfelykheid.—Die Bedeutung der Bastardierung in der Niederländischen Haustierzüchtung, an dem gegenwärtigen Vererbungsstandpunkte geprüft. (Hybridization in the breeding of domestic animals in Holland, tested on the basis of present views of heredity.)** Med. d. Vereenig. tot bevorder. van wetenschappelyke teelt in Nederland 6: 1–62. 1917. Zeitschr. Abstamm. Vererb. 20: 63–64. Sept., 1918.

446. Sirks, M. J. [Rev. of: Nichols, J. T. **On primarily unadaptive variants.** Amer. Nat. 50: 565–574. 1916.] Zeitschr. Abstamm. Vererb. 20: 64. Sept., 1918.

447. Smith, L. H. **Outline of a plan for corn breeding.** Illinois Agric. Exp. Sta. Circ. 221. *4 p.* 1918.—See Bot. Absts. 2, Entry 711.

448. Spillman, W. J. [Rev. of: Babcock, E. B., and R. E. Clausen. **Genetics in relation to agriculture.** (See Bot. Absts. 1, Entries 210, 220, 244.)] Jour. Heredity 9: 361. Dec., 1918.

449. Stark, Mary B. **An hereditary tumor.** Jour. Exp. Zoöl. 27: 509–529. *3 pl.* Feb., 1919.—See Bot. Absts. 2, Entry 1249.

450. Stark, Mary B. **An hereditary tumor in the fruit fly, Drosophila.** Jour. Cancer Res. 3: 279–301. *1 pl., 2 fig.* July, 1918.—See Bot. Absts. 2, Entry 1248.

451. Sturtevant, A. H. **An analysis of the effects of selection.** Carnegie Inst. Washington Publ. 265. *18 × 26 cm., 68 p., 1 pl., 14 fig.* Washington, D. C., 1918.—Dichaete, a mutant race of *Drosophila melanogaster*, was selected in both directions for bristle number. Both plus and minus lines were obtained. By means of linkage tests, using known and readily classifiable characters, these plus and minus lines were shown to differ in definite modifying factors. Modifiers were found to exist in the second and also in the third chromosome. Specific evidence was obtained, showing that contamination of allelomorphs did not occur. The cases adduced since 1914, especially by Castle, as evidence that contamination occurs in other forms, are analyzed in detail. Author concludes that modification of genes by selection or contamination has never been demonstrated, and is not in accord with the experimental results. Hypothesis of modifying factors has been experimentally verified in certain of these cases, and is sufficient to account for results obtained by its opponents.—*T. H. Morgan.*

452. Tammes, Tine. [Rev. of: (1) Beijerinck, M. W. **De enzymtheorie der erfelijkheid. (The enzyme theory of heredity.)** Versl. gen. Verg. K. Akad. Wet. Amsterdam. 25: 1231. 1917. (2) Idem. **The enzyme theory of heredity.** Proc. Kon. Akad. van Wetensch. Amsterdam, 19: 1275. 1917.] Zeitschr. Abstamm. Vererb. 19: 202–203. June, 1918.

453. TAMMES, TINE. [Rev. of: KAPTEYN, J. C. **Skew frequency curves in biology and statistics.** Receuil Trav. Bot. Néerland. 13: 105–157. 1916.] Zeitschr. Abstamm. Vererb. 19: 205–206. June, 1918.

454. TAMMES, TINE. [Rev. of: BATESON, W. **Note on experiments with flax at the John Innes Horticultural Institution.** Jour. Genetics 5: 199–201. 1915–16. Zeitschr. Abstamm. Vererb. 20: 50. Sept., 1918.

455. TAMMES, TINE. [Rev. of: SURFACE, FRANK M. **On the inheritance of certain glume characters in the cross Avena fatua × A. sativa var. Kherson.** Proc. National Acad. Sci. U. S. Amer. 2: 478–484. *1 fig.* 1916. Zeitschr. Abstamm. Vererb. 20: 51–52. Sept., 1918.

456. TAMMES, TINE. [Rev. of: SAUNDERS, EDITH R. **A suggested explanation of the abnormally high records of doubles quoted by growers of stocks (Matthiola).** Jour. Genetics 5: 137–158. 1915–16. Zeitschr. Abstamm. Vererb. 20: 54. Sept., 1918.

457. TAMMES, TINE. [Rev. of: SAUNDERS, EDITH R. **On the relation of half-hoariness in Matthiola to glabrousness and full hoariness.** Jour. Genetics 5: 145–158. 1915–16.] Zeitschr. Abstamm. Vererb. 20: 54–55. Sept., 1918.

458. TAMMES, TINE. [Rev. of: SAUNDERS, EDITH R. **On selective partial sterility as an explanation of the behavior of the double-throwing stock and the Petunia.** Amer. Nat. 50: 486–498. 1916.] Zeitschr. Abstamm. Vererb. 20: 55–56. Sept., 1918.

459. TAMMES, TINE. [Rev. of: GATES, R. R. **On pairs of species.** Bot. Gaz. 61: 177–212. *12 pl.* 1916.] Zeitschr. Abstamm. Vererb. 20: 57–58. Sept., 1918.

460. TAMMES, TINE. [Rev. of: CHILD, C. M. **Studies on the dynamics of morphogenesis in experimental reproduction and inheritance. 9. The control of head-form and head-frequency in Planaria by means of potassium cyanide.** Jour. Exp. Zoöl. 21: 101–125. 1916.] Zeitschr. Abstamm. Vererb. 20: 58. Sept., 1918.

461. THIEM. [Rev. of: HERTWIG, OSCAR. **Das Werden der Organismen. Eine Widerlegung von Darwins Zufallstheorie. [The "becoming" of organisms. An argument against Darwin's chance-theory.]** *710 p., 115 fig.* G. Fischer: Jena, 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 81–93. 1918.

462. UBISCH, G. v. **Kritische Betrachtungen zur Hypothese der primären und sekundären Koppelung. [Critical consideration of the hypothesis of primary and secondary coupling.]** Zeitschr. Abstamm. Vererb. 19: 193–201. *3 fig.* June, 1918.—See Bot. Absts. 3, Entry 298.

463. UBISCH, G. v. [Rev. of: (1) LEHMANN, E. **Art, reine Linie, isogene Einheit. [Species, pure line, isogenic unit.]** Biol. Centralbl. 24: 285–294. 1914. (2) LOTSY, J. P. **Prof. E. Lehmann über Art, reine Linie, isogene Einheit. [Prof. E. Lehmann on species, pure line, isogenic unit.]** *Ibid.* 24: 614–618. 1914. (3) LEHMANN, E. **Art, reine Linie, isogene Einheit. II. Species, pure line, isogenic unit. II.]** *Ibid.* 25: 555–560. 1915.] Zeitschr. Abstamm. Vererb. 20: 41–42. Sept., 1918.

464. WEATHERWAX, PAUL. **Improved technique for corn pollination.** Proc. Indiana Acad. Sci. 1917: 105–107. *2 fig.* 1918.—See Bot. Absts. 3, Entry 301.

465. WEATHERWAX, PAUL. **Variation and varieties of Zea Mays.** Proc. Indiana Acad. Sci. 1917: 99–103. 1918.—See Bot. Absts. 3, Entry 300.

466. WEATHERWAX, PAUL. **Gametogenesis and fecundation in Zea Mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club 46: 73–90. *Pl. 6–7, 2 fig.* Mar., 1919.—See Bot. Absts. 2, Entry 717.

467. ZADE, A. **Der Hafer. Eine Monographie auf wissenschaftlicher und praktischer Grundlage. [Oats. A monograph on scientific and practical principle.]** *8 vo., 355 p., 32 fig.* Fischer: Jena, 1918.—Book written from standpoint of practical agriculture but contains chapters on the cultural history, relationship, derivation, and varietal classification of oats. Opposes Nilsson-Ehle's view that his supposed mutations which resembled the wild oat (*Avena fatua*), were true mutations, and holds that they were results of crossing with the wild oats. [From rev. by E. BAUR in Zeitschr. Abstamm. Vererb. **20**: 52–53. Sept., 1918.]—*G. H. Shull.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

468. JANET, CHARLES. **Sur le Botridium granulatum.** Compt. Rend. Acad. Sci. Paris **166**: 960–963. *13 fig.* 1918.—*Botridium granulatum* is described as arising from motile zoospores or non-motile aplanospores ('propagules'). The reproductive cell gives rise to a spherical vesicle, with chloroplasts and nuclei imbedded in a peripheral cytoplasmic layer, the central part of the vesicle being filled with a clear liquid. The development of the mature plant from this "blastea syncitiale" is by an outgrowth upward to form the cylindrical or pyriform aereal part and other outgrowths downward to form the rhizoids. The non-motile aplanospores arise by the transformation of the protoplasmic stratum of certain vesicles into minute cells each of which becomes a "propagule." The vesicle bursts open and the aplanospores are scattered by the rain. They germinate immediately. In zoospore formation the protoplasm of the vesicle shows marked increase in the number of chloroplasts and nuclei. The chloroplasts elongate and a nucleus becomes associated with each. The cytoplasm immediately around each associated nucleus and chloroplast becomes delimited by a membrane. A single flagellum is formed, the zoospore swims for a short time, becomes quiescent and develops into a new plant in the same manner as the aplanospores.—In a few individuals, late in the growing season, strong suggestions of sexual reproduction are seen. A portion of protoplasm, provided with a nucleus and chloroplasts becomes separated from the rest by a membrane, appearing first like a zoospore mother cell. This cell, however, develops at once, within the mother plant to form a hollow spherical vesicle, absorbing all of the remaining protoplasm. The contents of this vesicle divide up into minute bodies, some of which were observed to have a distinct red stigma. Although none were seen with cilia nor was there any evidence of fusion of these bodies the author is of the opinion that they are gametes. —*F. A. McAllister.*

469. YENDO, KICHIASABURO, AND JIRO IKARI. **Auxospore formation of Chaetoceras debile Cleve.** Bot. Mag. Tôkyô **32**: 145–149. *Pl. 2 (8 fig).* 1918—All stages in auxospore formation occurred in great abundance in April, 1918, at the Marine Laboratory of Oshoro. The authors were able to observe complete series and to follow the entire development of individual auxospores and their subsequent germination. The whole process occupied about seven hours. Their account confirms the earlier reports of Schultz and Gran. The asexual auxospores are formed by the contraction of the cell contents and migration through an oval lateral pore. The extruded protoplast remains attached to the old filament, where it increases in size and then begins division at right angles to the old filament. The new filaments have a diameter nearly twice that of the auxospore-forming filaments.—*Leonas L. Burlingame.*

BRYOPHYTES

470. DOUIN, C., AND DOUIN, R. **Le Reboulia Raddi.** Rev. Gén. Bot. **30**: 129–145. *5 fig.* 1918.—*Reboulia* is autoicous, sometimes becoming apparently dioicous by the abortion of one sexual apparatus; it is never paroicous. Genus is distinguished from other Marchantiaceae by formation of male receptacle toward apex of a ventral or subfloral branch, female receptacle appearing at apex of a separate branch which has developed apically from male-

producing shoot. Under exceptional conditions a thallus may terminate in a female receptacle without having borne a male one; or of two branches resulting from a dichotomy, one may bear a female, the other a male, receptacle.—Three species are recognized, two of them new; they are distinguished by structure of female receptacles, character of spores, and position of male receptacles.—*Rays* are defined as divisions of female head which protect the piliferous cavities; *lobes*, as those parts which cover and protect the involucres. On this basis, the greater number of species of *Marchantia* and all species of *Preissia* have rays only, those of *Preissia* being much reduced; *Lunularia, Clevea, Sauteria,* and *Peltolepis* have neither rays nor lobes; the remaining species of *Marchantia* (for which a separate genus, *Marchantiopsis*, is proposed), and all other genera of Marchantiaceae have lobes only, their rays being rudimentary or indistinct. [See Bot. Absts. 1, Entry 1047.]—*C. E. Allen.*

PTERIDOPHYTES

471. BROWN, J. G. **Prothallia of Tmesipteris.** [Reviw of: HOLLOWAY, J. E. **The prothallus and young plant of Tmesipteris.** Trans. New Zealand Inst. 50: 1–44. 1917. (See following Entry, 472.)] Plant World 21: 241–243. 1918.—Reviewer summarizes author's results and regards the paper as a very valuable one. Criticizes adversely the illustrations and the use of "loose" terminology.—*E. W. Sinnott.*

472. HOLLOWAY, J. E. **The prothallus and young plant of Tmesipteris.** Trans. New Zealand Inst. 50: 1–44. *Pl. 1–3.* 1917.—Author states that *Tmesipteris* occurs commonly throughout New Zealand as an epiphyte on stems of tree ferns and other forest trees, and where rainfall is very heavy, in heaps of humus on the ground at bases of trees. His young plants were secured in the latter situation. Series of prothallia found by him measure from 1 to 18 mm. in length. The unbranched forms are carrot-shaped, tapering down from a fairly thick head. Sooner or later the head of the prothallium forks dichotomously. Archegonia and antheridia are borne over the entire surface of the prothallium. Some space is given to a description of the anatomy, embryology and development of the sporophyte. Author concludes that *Tmesipteris* exhibits so little resemblance to any other class of Pteridophyta, living or extinct, that its phylogenetic position remains a matter of uncertain speculation. [See preceding Entry, 471.]—*J. H. Faull.*

473. THOMPSON, J. M. **The anatomy and affinity of Stromatopteris moniliformis Mett.** Trans. Roy. Soc. Edinburgh 52^1: 133–156. *Pl. 1–4.* 1918.—Paper based on two incomplete herbarium specimens and a fertile leaf. Author concludes that *Stromatopteris* ranks with the Gleichenias, but is a xerophytically reduced type.—*J. H. Faull.*

474. THOMPSON, J. M. **A further contribution to the knowledge of Platyzoma microphyllum R. Br.** Trans. Roy. Soc. Edinburgh 52^1: 157–165. 1918.—Three types of spores are found on pinnae of *Platyzoma microphyllum.* Majority of sporangia are small and contain about 32 small spores each. Remaining sporangia are large and contain about 16 large spores each. Spores of intermediate size are developed when spore output in any sporangium is greatly decreased. Markings in all 3 types of spores are similar. Author favors view that *Platyzoma* is truly heterosporous, but has not yet effected a demonstration.—*J. H. Faull.*

SPERMATOPHYTES

475. ANONYMOUS. **Tetramerous flowers of Narcissus.** Jour. Roy. Hort. Soc. 43: 34. 1918.—Two specimens from different sources showed in each case eight perianth parts, eight stamens, and four carpels. The tetramerous condition seems not be to rare in *Narcissus* and nearly allied forms.—*C. E. Allen.*

476. BOWLES, E. A. **Two-flowered snowdrop.** Jour. Roy. Hort. Soc. 43: 31. 1918.—A plant of *Galanthus Elwesii* showed the usual two foliage leaves from the soil, the flowering

stem bore a third leaf about three inches above the soil, in the axis of which was a second flower. It appears that the axis of the bulb had elongated, carrying the flowering stem up above ground.—*C. E. Allen.*

477. DAHLGREN, K. V. O. **Die jungeren Entwicklungsstadien der Samenanlagen von Typha latifolia L.** **[Early stages of seed-formation in Typha latifolia.]** Svensk Bot. Tidskr. 12: 207–211. *8 fig.* 1918.—The formation of the embryo-sac is not of the *Lilium* type, but the macrosopre mother-cell gives rise to 4 macrospores, 3 of which break down. Occasionally two macrospore mother-cells are present and each produces an 8-celled embryo-sac. The primary archesporial cell divides to form the macrospore mother-cell and a cover cell, which divides to form part of the nucellus. The epidermal tissue of the nucellus is found to be composed of two cell layers.—*C. H. Farr.*

478. EKSTRAND, HARRY. **Zur Zytologie und Embryologie der Gattung Plantago.** **[Cytology and embryology of Plantago.]** Svensk Bot. Tidskr. 12: 202–206. *7 fig.* 1918.—In one individual of *Plantago major* there were a few diakinetic stages found in which only part of the chromosomes are paired. The unpaired ones do not lie in the equator of the metaphase spindle, do not divide, and are unequally distributed to the daughter nuclei. There result pollen grains of various sizes, the smaller of which do not last long. In another individual all reduction division stages were normal. An occasional anomalous unfertilized embryo-sac is found, such as one with 16 nuclei, or 7 nuclei, or with two large and many small nuclei. Some of these are fertilized, but their subsequent history is unknown.—*C. H. Farr.*

479. GRIER, N. M. **Double flowers in Hemerocallis fulva Linn.** Torreya 18: 242. 1918. —Six specimens of double flowers in this species were collected at Kirkwood, Missouri. The plant bearing these flowers was apparently typical and there was no indication of insect injury in connection with the flowers. The flowers show a perianth of 12 distinct alternating segments; 12 stamens, some of which may be abortive; 2 styles, united and frequently abortive into a claw-shaped body; ovules minute. It is suggested that the term *diplous* be applied to such flowers.—*Margaret C. Ferguson.*

480. HAZEN, T. E. **The trimorphism and insect visitors of Pontederia.** Mem. Torrey Bot. Club. 17: 459–484. *2 pl., 12 fig.* 1918.—A summary of previous work on trimorphism in this and related genera is given, and a morphological study of the flower is presented from the standpoints of trimorphism and adaptability to insect visitors. There is also a discussion of cross pollination between the three types of flowers, accompanied by diagrams. Among insect visitors, species of Lepidoptera, Hymenoptera and Diptera are listed. [See Bot. Absts. 1, Entry 830.]—*V. A. Pease.*

481. JAUCH, BERTHE. **Quelques points de l'anatomie et de la biologie des Polygalacées.** **[On the anatomy and biology of the Polygalaceae.]** Bull. Soc. Bot. Genève 10: 47–84. *15 fig.* 1918.—The author concludes that the genus *Xanthophyllum* is not to be separated as a distinct family from the Polygalaceae, as Gagnepain has maintained; in spite of its regular flowers and of other differences of generic importance, its close relationship with the Polygalaceae is shown by the relation of its floral parts and by the form of its pollen. A detailed study was made of the floral structures of *Polygala Chamaebuxus*, with which were compared those of other species of the same section, particularly *P. venenosa.* and of one species of *Securidaca.* Mention is also made of various points noted in the study of other species of *Polygala.* Experiments show that the flowers of *Polygala Chamaebuxus* are self-sterile; those of *P. vulgaris*, on the contrary, are self-fertile. Descriptions are given of the course of the vascular bundles in the flower, the development and dehiscence of the anther, and the structure of the pistil in *P. Chamaebuxus.* Some or occasionally all of the anthers of a flower may be sterile, as a result of a breaking down of the sporogenous cells in a manner analogous to that normally characteristic of the cells of the tapetum. The bicarpellate ovary contains two cavities separated by a thin partition; on each side of this partition is a single ovule.

The placentation is thus apparently axile but in reality parietal, as is shown by the innervation of the ovules. This is found to be true also in the other species examined. The macrospore mother cell divides to form three cells, of which the innermost develops into an embryo sac of typical form. The polar nuclei unite shortly before fertilization. In the more primitive members of the family the anther has four loculi; types of anthers with three or two loculi, found in various species, are the result of a reduction from the original type. The nectarial disk (when this is not reduced to a small gland without vascular tissue, as it is in *Polygala Chamaebuxus*) is innervated from the androecium. Lysigenous glands, found numerously in the leaves and various parts of the flowers of certain American species, suggest a relationship between this family and the Terebinthinaceae (Burseraceae).—*C. E. Allen.*

482. Ratcliff, H. W. **Double-spathed Richardia.** Jour. Roy. Hort. Soc. 43: 31. 1918. —The development of an extra spathe is not very uncommon in some species of *Richardia.* An example of this kind in *R. africana* showed slight green markings on the second, lower spathe.—*C. E. Allen.*

483. Shaw, W. R. **Some microtechnical methods and devices.** Philippine Jour. Sci. Bot. 13: 241–261. *Fig. 5.* 1918.—As a result of several years of teaching, and of collecting and preparing materials, the author has developed modifications of methods laid down in the various laboratory handbooks, and presents several ingenious ways of using microscope; equipment so as to avoid multiplication of accessory parts, and hence to keep down the expense of laboratory equipment. He discusses ocular micrometers used as stage micrometers; the square-ruled micrometer used as a position indicator, and also for drawing to scale; the use of capillary glass rods for cover-glass supports, and methods for making autographic records on micrographic slides, and for recording magnification on micrographic negatives. Of special interest to those working with plankton, and with relatively large objects mounted entire, are his methods developed during a study of the Volvocaceae of the vicinity of Manila. Hastening the concentration of glycerine by means of the vacuum pump, a method for making sealed glycerine mounts of the larger Volvocaceae, and an adaptation of the Osterhout method for rapid mounting of large objects in water media are discussed; a new form of plankton net is described; two washing devices for small objects are figured and described, and methods of estimating the number of cells in spherical surfaces are given. [See Bot. Absts. 2, Entry 332.]—*V. A. Pease.*

484. Souèges, R. **Embryogenie des Liliacées. Developpement de l'embryon chez l'Anthericum ramosum.** [**Embryogeny of Liliaceae. Embryo development in Anthericum ramosum.**] Compt. Rend. Acad. Sci. Paris 167: 34–36. 1918.—The early stages in development of the embryo of *Anthericum* are here traced, and compared with the corresponding stage in *Sagittaria* and *Myosurus.* The conclusion is reached that the embryogeny of monocotyledons and dicotyledons is fundamentally the same, although presenting differences which suggest the possibility of establishing relationships among the families of the two great groups. —*M. A. Chrysler.*

485. Tackholm, G., and E. Söderberg. **Neue Beispiele der simultanen und sukzessiven Wandbildung in den Pollen-mutterzellen.** [**New examples of simultaneous and successive wall-formation in pollen-mother-cells.**] Svensk. Bot. Tidsk. 12: 189–201. *9 fig.* 1918.— The pollen-mother-cells of *Aristolochia fimbriata* undergo successive bipartition by cell plate but those of *A. Sipho* divide by quadripartition. In the latter there is found to be a slight thickening of the spindle fibers after the heterotypic nuclear division but no cell plate or wall is produced. After the homoeotypic nuclear division, walls are laid down as fine plates at the equator of the several spindles. The microspores are usually in a perfect tetrahedral arrangment, whereas in *A. fimbriata* there are none so oriented. In *Asarum europaeum,* however, which is characterized by quadripartition, there are some perfect tetrads and some of other forms. In *Vinca rosea* the microspores are for the most part arranged in perfect tetrads. It is therefore concluded that the mother-cell must divide by quadripartition, although Frye

and Blodgett found a few tetrads in the related genus *Apocynum* in which there was only bipartition of the mother cells. In *Albizzia lophanta* the mother-cell undergoes two somatic divisions, forming a group of 4 cells. The nucleus of each of these then passes through the heterotypic and homoeotypic mitoses successively and the cell is finally divided by quadripartition. This latter process is said to take place by the formation of partitions as equatorial plates in the spindles. Quadripartition is reported for 3 other species of dicotyledons: *Epimedium niveum*, *Piper subpeltatum*, and *Saururus cernuus*. It was also found in one monocotyledon, *Dioscorea quinquefolia*, where it takes place by means of equatorial plates on the spindles. Six other monocotyledons were found to have bipartition. In *Canna*, tetrads were found, but it is not held that this is strong evidence of a previous quadripartition.—The 9 text figures show interkinetic, mitotic and tetranuclear stages, respectively, but none are given of cytokinesis. The authors apply the occurrence of the two types of division to the systematic classification of angiosperms.—*C. H. Farr.*

486. VISCHER, W. **Sur une monstruosité syncaulome du Taraxacum officinale Weber. [Syncauly in Taraxacum officinale.]** Bull. Soc. Bot. Genève 10: 21–25. *2 fig.* 1918.—In the case described, a hollow cylinder 2–3 cm. in diameter bears at the top 7 or 8 heads, some clearly distinct, others confluent; within the cylinder are 12 free stalks bearing normal heads and some leaves. In the cylinder are two concentric series of bundles, of which those in the outer series are normally oriented, but those of the inner series have their phloem turned toward the center of the cylinder. The author concludes that the case in question is one of connection or coherence, rather than of fasciation strictly speaking. Fasciation proper results from the replacement of a growing *point* by a growing *line*, produced (according to Church and Worsdell) by a repeated dichotomy. In the present case there seems to have been a union of growing points originally separate, their number not increasing toward the apex.—*C. E. Allen.*

487. WORSDELL, W. C. **Stipules of hawthorn.** Jour. Roy. Hort. Soc. 43: 29. 1918.—Leaves of *Crataegus sinaica* show transitions between leaf segments and so-called "stipules," demonstrating that the latter are parts of the lamina, and not true stipules.—*C. E. Allen.*

488. WORSDELL, W. C. **Many-flowered tulips.** Jour. Roy. Hort. Soc. 43: 35. 1918.—Branched tulips are common, especially among Darwin varieties in many gardens. The many-flowered condition arises from adnation of branches, not from fasciation. Branching occurs in *Tulipa biflora*, *T. saxatilis* and *T. praestans.*—*C. E. Allen.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

489. BERRY, EDWARD W. **Pleistocene plants from Tennessee and Mississippi.** Torreya 19: 8–10. Jan., 1919.—Records *Osmunda* sp., *Quercus predigitata* Berry and *Castanea pumila* Mill. from the Pleistocene at Adamsville, McNairy County, Tennessee; and nutlets of *Celtis mississippiensis* Bosc. from the Loess at Vicksburg, Mississippi, the last not heretofore known in the fossil state.—*E. W. Berry.*

490. BERRY, EDWARD W. **The age of the Brandon lignite and flora.** Amer. Jour. Sci. 47: 211–216. Mar., 1919.—Discusses the fossil flora from this classic locality in Vermont, and from a consideration of the floral evidence and the indicated climatic conditions at the time of the deposit of the Brandon lignite as compared with other deposits of known age, concludes that the Brandon lignite and its contained flora could not be Miocene in age as many students have supposed, but belongs in the earlier half of the Tertiary period (Eocene).—*E. W. Berry.*

491. HOWE, M. A. **On some fossil and recent Lithothamnieae of the Panama Canal Zone.** U. S. National Mus. Bull. 103: 1–13. *pl. 1–11.* 1918 (1919).—Describes the following new

species: *Archaeolithothamnium episporum* from the Pleistocene and Recent, *Lithothamnium vaughanii* from the Oligocene Culebra formation, *Lithothamnium isthmi* from the Oligocene Emperador limestone, and records *Lithoporella melobesioides* Foslie from the Oligocene Emperador limestone.—*E. W. Berry.*

492. POLLOCK, JAMES B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—See Bot. Absts. 2, Entries 555, 623.

493. TRELEASE, WM. **The ancient oaks of America.** Mem. Brooklyn Bot. Gard. 1: 492–501. July 6, 1918.—Exclusive of those now referred to the family prototype, *Dryophyllum*, or believed to represent genera not comprised in the Fagaceae, the nominal North American fossil oaks number about 150, or somewhat less than half as many as the species now living. Of these about one-third pertain to each of three geologic period,—48 for the Cretaceous, 56 for the Eocene, and 42 for the Miocene. Little is known of Pliocene oaks, but four North American and four Brazilian species have been described. From Pleistocene or glacial deposits, 20 are known. These are essentially identical with oaks now living in the regions where the fossils have been found; the Pliocene oaks are also of modern types, but as yet less clearly identifiable with living species. None of the earlier fossils is believed to have survived from one geologic period to another.—For convenience of comparison, the Cretaceous and Tertiary oaks have been arranged on their leaf-form into 14 general groups. Of these, one with oleander-like leaves, one with ash-like foliage, two with alder-like foliage and one with birch or haw-like leaves, are found scarcely comparable with existing oaks if, indeed, they pertain to *Quercus*. A bayberry-like type and one with small trilobed leaves are equally questionable.. One group with magnolia-like foliage and two with chestnut-like leaves suggest certain groups that are living now; and two groups, respectively with lobed and pungently toothed leaves, are even more suggestive of existing oaks.—The collective impression made by these ancient American oaks is that in the several geologic ages they have re-evolved a multiplicity of comparable foliage forms from a single initial and that this has been of the semi-xerophytic small holly-like type; but that no traciable ancestry of existing species is to be looked for earlier than very late Tertiary time. In one Tertiary oak (*Q. Palaeo-ilex*) Ettingshausen finds a fore-shadowing of all existing foliage types; but the species of America are believed by the writer to have developed independently of those now growing in Europe and Asia, probably assuming their present specific characters toward the end of Tertiary time. —*Wm. Trelease.*

PATHOLOGY

DONALD REDDICK, *Editor*

494. AGRELLIUS, F. U. G. **Data concerning the dissemination of wheat rust Puccinia graminis Pers.** Trans. Kansas Acad. Sci. 28: 115–117. 1916–17.—The possibility of epiphytotics of stem rust of wheat being due to the rust carrying over on grasses is presented. The names of a few grasses bearing rust as they appear in Kansas are named, but the species of rust is not identified. No examination was made morphologically or physiologically of these rusts.—*L. E. Melchers.*

495. BANCROFT, C. K. **Diseases in plants with special reference to fungi parasitic on crops in British Guiana.** Jour. Board. Agric. British Guiana 11: 47–57. 1918.—A brief review is given of the nature and causes of diseases in plants. Methods for preparing and applying different fungicides are described. The following list of fungi which cause diseases in British Guiana is given. Sugar cane: *Marasmius sacchari, Leptosphaeria sacchari, Melanconium sacchari, Thielaviopsis paradoxa, Colletotrichum falcatum, Cercospora vaginae*; rice: *Piricularia oryzae, Tilletia horrida, Sclerotium oryzae*; cocoanut: *Bacillus* sp, *Pestalozzia palmarum*; cacao: *Marasmius perniciosus, Phytophthora faberi, Thyridaria tarda, Nectria bainii, Cor-*

ticium salmonicolor; coffee: *Sclerotium* sp., *Stilbum nanum, Hymenochaete noxia, Colletotrichum coffeae, Sphaerostilbe flavida*; lime: *Sphaeropsis tumefaciens, Fusarium limonis, Hymenochaete noxia, Loranthus theobromae, Capnodium citricolum, Colletotrichum gloeosporioides*; orange: *Penicillium olivaceum, Fusarium limonis*; Para rubber: *Melanopsammopsis ulei, Fomes semitostus, Hymenochaete noxia, Thyridaria tarda*; mango: *Gloeosporium mangiferae, Dimerosporium mangiferae*; bread fruit: *Gloeosporium mangiferae*; banana: *Bacillus* sp. *Ustilaginoidella oedipègera, Gloeosporium musarum*; maize: *Ustilago maydis*; cotton: *Colletotrichum gossypii, Bacillus gossypinus*; sisal: *Colletotrichum agaves*; grape: *Uncinula spiralis, Penicillium glaucum, Guignardia bidwellii*; papaw: *Pucciniopsis caricae*; tomato: *Bacillus solanacearum;* pepper: *Colletotrichum nigrum*; ground nut: *Cercospora personata*; cassava: *Cercospora cearae*; pineapple: *Penicillium* sp., *Thielaviopsis paradoxa*.—*J. B. Rorer.*

496. Bancroft, C. K. **The mango and bread fruit disease.** Jour. Board Agric. British Guiana 11: 75. 1918.—This disease caused by *Gloeosporium mangiferae* has caused an enormous loss of fruit during the past six months. The disease may occur on fruit of all ages and makes it unfit for consumption. Two sprayings with bordeaux mixture are sufficient to control the disease; the first should be made when the fruit is set and the second, three or four weeks later.—*J. B. Rorer.*

497. Barrett, J. T. **Bacterial gummosis of apricots.** Preliminary report. Monthly Bull. State Comm. Hort. [California] 7: 137–140. *Fig. 15–18.* 1918.—The disease is similar if not identical with gummosis of stone fruits described by Barss and others in Oregon. Inoculations with pure cultures of bacteria from cankers gave infection. Preliminary experiments with the surgical methods employed for control of pear blight give indications of success. The disease may prove as serious for apricots in California as blight (*Bacillus amylovorus*) is for pears.—*D. Reddick.*

498. Barss, H. P. **Bacterial gummosis of stone fruits.** Monthly Bull. State Comm. Hort. [California] 7: 121–136. *Fig. 4–14.* 1918.—Nature, cause and control of gummosis caused by *Pseudomonas cerasi*, based largely on previously reported work by the author.—*D. Reddick.*

499. Beach, Walter S. **The Fusarium wilt of China aster.**—Rept. Michigan Acad. Sci. 20: 281–308. 1918.—See Bot. Absts. 2, Entry 624.

500. Bisby, G. R. **A Fusarium disease of garden peas in Minnesota.** (Abstract.) Phytopath. 8: 77. 1918.—A species of *Fusarium* has been proved pathogenic. It attacks the germinating seed and also causes wilt of plants by attacking roots and stem.—*D. Reddick.*

501. Brandes, E. W. **Banana wilt (Panama disease).** Porto Rico Agric. Exp. Sta. Rept. 1916: 29–31. *Pl. 4–5.* 1918.—Proof of the pathogenicity of *Fusarium cubense* for banana and a technical description of the organism.—*D. Reddick.*

502. Bryce, P. I. **Injurious fungi of Ste. Anne de Bellevue. 1917.** Ann. Rept. Quebec Soc. Prot. Plants 10: 49–51. 1918.—The following diseases are mentioned as injurious: apple: black rot and canker, scab; bean: blight and anthracnose; corn: smut; currant: leaf spot or anthracnose, rust; hollyhock: rust; pear: scab; plum: shothole, brown rot; potato: early blight and especially late blight; tomato: blossom end rot and Septoria leaf-spot.—A table is included which shows the mean temperature and precipitation for the growing season of 1917 as compared with the previous ten-year average.—Sclerotia of *Claviceps purpurea* were germinated abundantly without the action of frost.—*D. Reddick.*

503. Burt, Edward Angus. **Corticiums causing Pellicularia disease of the coffee plant, hypochnose of pomaceous fruits, and Rhizoctonia disease.** Ann. Missouri Bot. Gard. 5: 119–132. *Fig. 1–3.* 1918.—See Bot. Abst. 1, Entry 395.

504. COOK, MELVILLE, T.. **Report of the Department of Plant Pathology** Ann. Rept. New Jersey Agric. Exp. Sta. 1916: 561–625. 1918.—This publication takes up climatic condition of the year, epidemics of diseases and a list of the most common diseases of the year. It also includes papers by W. H. Martin, by W. S. Krout and by H. Clay Lint.—*M. T. Cook.*

505. COOK, MELVILLE, T. **Report of the Department of Plant Pathology.** Ann. Rept. New Jersey Agric. Exp. Sta. 1917: 523–563. 1918.—This publication outlines the investigations in progress, epidemics of diseases, plant disease survey and a list of the common diseases of the year. It also includes papers by R. F. Poole, by W. H. Martin and by Mel. T. Cook.—*M. T. Cook.*

506. COONS, G. H. **Michigan potato diseases.** Michigan Agric. Exp. Sta. Special Bull. 85. *49 p., 41 fig.* 1918.—Popular descriptions with illustrations and notes on the distribution in Michigan of the following diseases: late blight (*Phytophthora*), early blight (*Alternaria solani*), tip burn, scab (*Actinomyces chromogenus*), black scurf (*Rhizoctonia*), wilt (*Fusarium*), black leg (*Bacillus atrosepticus*), curly dwarf, leaf roll, mosaic, dry rots (caused by *Fusarium* spp., also *Armillaria mellea*). Various tuber troubles, hollow heart, frost injury, internal brown spot, etc. are described. Methods of controlling the diseases are stated.—*D. Reddick.*

507. DEMANDT, ERNST. **Untersuchungen über Kanker und Braunfäule am samoanischen Kakao. [Investigation of canker and brown rot of Samoan cacoa.]** Zeitschr. Pflanzenkr. 28: 241–291. 1918.—In 1904 a canker disease of cacao made its appearance in the rather extensive plantations in Samoa. The disease was not thought at first to be contagious. A commission appointed by the government, attributed it to poor soil. By 1909 the canker had spread over large areas causing great damage and killing thousands of trees. About this time another disease referred to as brown rot, made its appearance. This rot attacked the cacao fruits. In order to determine the nature of these two diseases which threatened cacao culture in Samoa, the government obtained the services of Dr. Gehrmann a plant pathologist. Gehrmann studied both diseases and came to the conclusion that canker was caused by a *Fusarium* which he designated *Fusarium samoense* n. sp. He reported brown rot as due to *Phytophthora* sp. Both canker and brown rot occur in other cacao producing countries such as Ceylon, Java and Trinidad. All workers have agreed that brown rot is caused by *Phytophthora faberi* Maubl. but there is disagreement among them as to the cause of the canker. The author after careful study and infection experiments concludes that both brown rot and canker are caused by *Phytophthora faberi*. He finds *Fusarium samoense* closely associated with *Phytophthora* in the cankers but shows that it is a saprophyte. *Phytophthora faberi* attacks fruits and stems of *Hevea brasiliensis*, which is sometimes planted along with cacao. The author gives the results of experiments on the cacao diseases and a summary of the methods by which they may be held in check.—*L. O. Kunkel.*

508. DODGE, B. O., AND J. L. ADAMS. **Some observations on the development of Peridermium cerebrum.** Mem. Torrey Bot. Club 17: 253–281. *Pl. 4–6, 3 fig.* 1918.—A description of the galls produced by *Peridermium cerebrum* on *Pinus rigida* growing in the pine barrens of New Jersey and on *P. virginiana* in Virginia. It is thought that infection usually takes place when the trees are from one to four years old. The fungus often spreads peripherally from the point of infection by a series of sudden localized migrations and stimulates the production of several galls in the same canker, the center gall being the oldest.—The spermatia are produced on spermatiophores which form practically a continuous layer over the gall. The origin and the development of aecia are discussed in some detail. No instance has been found where spermagonia and aecia are following each other on the same area of the same gall, however both may develop on different parts of the same gall. Observations seem to indicate that there is an alternation of aecia and spermagonia as previously reported by other workers. Successful infection experiments have been made on the following species of oak: *Quercus illicifolia*, *Q. marylandica*, and *Q. heterophylla*. [See Bot. Absts. 2, Entry 282.]—*J. L. Weimer.*

509. DOIDGE, E. M. **Potato diseases. VII.—Late blight (Phytophthora infestans de Bary).** S. African Fruit Grower 5^3: 47. 1918.

510. DOIDGE, E. M. **Walnut blight (Bacterium juglandis Pierce).** S. African Fruit Grower 5^4: 68. 1918.

511. DOIDGE, E. M. **Potato diseases, VIII. Internal brown fleck.** S. African Fruit Grower 5^5: 94. 1918.

512. ELLIOTT, J. A. **Arkansas peach diseases.** Arkansas Agric. Exp. Sta. Bull. 149. *9 p., 5 pl.* 1918.—Brief descriptions and illustrations of the following diseases with notes on their prevalence, destructiveness and control in Arkansas: Brown rot (*Sclerotinia cinerea*), black spot (*Bacterium pruni*), scab (*Cladosporium carpophilum*), leaf curl (*Exoascus deformans*), crown gall (*B. tumefaciens*), die back (*Valsa leucostoma*), root rot (*Armillaria mellea*), wood rots (*Coriolus versicolor, Pycnoporus cinnabarinus* and *Schizophyllum commune*).—*D Reddick.*

513. GILES, P. L., AND J. O. CARRERO. **Chlorosis of sugar cane.** Porto Rico Agric. Exp. Sta. Rept. **1917**: 10–20. 1918.—In extreme cases the leaves are of normal size but creamy white in color; in mild cases the veins are green thus giving the leaf a striated appearance.—The trouble occurs in numerous restricted areas in southern part of island, the areas ranging in size from a few square feet to an acre. Chlorosis may appear at any stage of growth from two months after planting up to the time of arrowing.—Analyses of soil were made from a large number of fields of healthy and of diseased cane to determine whether chlorosis is associated with an excessive amount of carbonate of lime. "While chloritic cane was found only on markedly calcareous soils, all calcareous soils did not produce chlorotic cane."—Analyses of ash of green and chloritic leaves shows that the only consistent difference is a reduced amount of iron in chlorotic leaves.—Painting leaves of chlorotic plants with 0.5 per cent solution of ferrous sulfate caused them to turn green; dusting them with powdered sulfate had no effect. Spraying with sulfate of iron is impracticable as a means of control because of the necessity of frequent applications.—Field experiments were performed which "show that the chlorosis is ameliorated to some extent by the application of stable manure containing ferrous sulfate and stable manure alone, but small applications of these materials produced only slight improvement and larger applications, though more effective, by no means overcame the chlorosis completely."—*D. Reddick.*

514. GRAY, GEO. P. **The consumption and cost of the economic poisons in California, 1916.** Monthly Bull. State Hort. Comm. [California] **7**: 140–144. 1918.—Estimates for the various materials are based on figures furnished by County Horticultural Commissioners in 28 counties representing 70 per cent of the acreage of fruit in the state. Total estimated expenditure for poisons (fungicides, insecticides, etc.) $2,468,000.—*D. Reddick.*

515. GRAY, GEO. P. **Wettable sulfurs.** Monthly Bull. State Hort. Comm. [California] **7**: 191–192. 1918.—Use of powdered glue, 1.5 ounces, and hot water, 3 gallons, for 10 pounds of powdered sulfur.—*D. Reddick.*

516. HODGSON, ROBERT W. **Black smut of figs.** Monthly Bull. State Comm. Hort. [California] **7**: 188–189. 1918.—See Bot. Abst. 1, Entry 618.

517. HODGSON, ROBERT W. **Little leaf of deciduous fruits.** Monthly Bull. State Comm. Hort. [California] **7**: 529–532. 1918.—The disease occurs to a certain extent in all parts of California but is more common in trees grown in light, sandy soil. Evidence is presented tending to support the theory that the trouble is due to drought.—*D. Reddick.*

518. HODGSON, ROBERT W. **Citrus blast.** Quart. Bull. State Plant Bd. Florida **2**: 123–130. *Pl. 3–4, fig. 77.* 1918.—Description of the disease, caused by *Bacterium citrarefaciens*, as it occurs in California.—*D. Reddick.*

519. HARLAND, S. C. **Tomato breeding in St. Vincent.** Agric. News Barbados 17: 10. 1918.—Describes crosses made between the St. Vincent native tomato and Ponderosa. In the F_2 generation some plants were immune to the Blossom End Rot, a disease to which Ponderosa is very susceptible in St. Vincent. The St. Vincent native tomato is immune to this disease. Some plants of this generation showed a greater power of resistance to *Bacterium solanacearum* than others.—*J. B. Rorer.*

520. HUGHES, H. D. **Improved method of fighting smut in oats.** Iowa Agric. Exp. Sta. Circ. 45. *8 p., illust.* 1918.—The atomizer method of treatment described. One pint of formaldehyde diluted with 1 pint of water is sufficient for 50 bushels of seed.—Iowa oat fields showed an average of 7.5 per cent of smut in 1912-1913.—Variety Early Champion is more susceptible to smut than others and in general early varieties are more susceptible than late ones.—*D. Reddick.*

521. JEHLE, R. A. **Effect of disinfectants upon Bacterium citri.** Quart. Bull. State Plant Bd. Florida 2: 112-123. *2 pl.* 1918.—An exhaustive test to determine the maximum time required, by certain disinfectants, to kill the organism. Technique employed is fully described. The following substances were tested and in the concentrations indicated: mercuric chlorid 1:500, 1:1000, 1:1500, 1:2000, 1:2500, 1:3000; chlorazene, 1:250, 1:500, 1:1000, 1:1500, 1:2000; trikresol, 0.5, 1.2 and 3 per cent solutions; lysol, 0.5, 1.2 and 3 per cent solutions; creolin (Pearson), 1:50, 1:75, 1:100; carbolic acid, 0.8, 1, 2, 3, 4 and 5 per cent solutions; formaldehyde, numerous concentrations from 0.8 to 3.2 per cent solutions; kreso, zenolium, carbolinium and maldezone in several dilutions; copper sulphate, 2 to 8 per cent solutions.—Since pruning tools and the like when dipped into a solution usually become dry within one minute, the following minimum concentrations of germicides should be used for disinfection purposes: mercuric chlorid 1:1500; chlorazene, 1:250; trikresol, lysol and creolin, 1 per cent solution; formaldehyde 3.2 per cent (8 per cent commercial), kreso, 1:40; carbolinium, full strength.—The addition of "red soil," 10 per cent by weight, to solutions of mercuric chlorid did not decrease the germicidal action.—*B. citri* was killed in mercuric chlorid, 1:1500, at 80°F. in thirty seconds and at 44° F. in forty seconds.—*D. Reddick.*

522. JOHNSTON, J. R. **Diseases of sugar-cane in tropical and sub-tropical America, especially the West Indies.** (With notes by S. F. ASHBY, C. K. BANCROFT, W. NOWELL, AND J. A. STEVENSON.) West Indian Bull. 16: 275-308. *7 pl.* 1918.—The history and exact descriptions of the following diseases and fungi are given; the gumming disease (*Bacterium vascularum*), humid gangrene, stem-rot or Iliau (*Gnomonia iliau*), red leaf spot (*Eriosphaeria sacchari*), smut (*Ustilago sacchari*) thread blight (*Hypochnus sacchari*), root disease (*Marasmius sacchari* and *M. stenophyllus*), red rot (*Colletotrichum falcatum*), rind fungus (*Melanconium sacchari*), wilt (*Cephalosporium sacchari*), pineapple disease (*Thielaviopsis paradoxa*), brown leaf spot (*Cercospora longipes*), red spot of leaf sheath (*Cercospora vaginae*), yellow leaf spot (*Cercospora kopkei*), eye leaf spot (*Helminthosporium sacchari*), red rot of leaf sheath (*Sclerotium rolfsii*), *Trichosphaeria sacchari*, *Sphaerella sacchari*, *Leptosphaeria sacchari*, *Thyridaria tarda*, *Nectria laurentiana*, *Odontia saccharicola*, *O. sacchari*, *Scizophyllum commune*, *Laternea columnata*, *Cytospora sacchari*, *Coniothyrium melasporum*, *Darluca melaspora*, *Diplodia cacaoicola*, *Melanconium saccharinum*, and *Himantia stellifera*. Yellow stripe, top rot, sereh, mottling disease, wither tip and chlorosis, the causes of which are unknown or nonparasitic, are also described. The author deals principally with the diseases as they occur in Cuba and Porto Rico; their prevalence and importance in Jamaica, British Guiana, Barbados and Porto Rico are discussed in the notes.—The root disease caused by *Marasmius sacchari* is by far the most destructive in the area dealt with. Nomenclature of *Melanconium sacchari* is thoroughly discussed and it is stated that there is no connection between this fungus and *Trichosphaeria sacchari*.—As control measures are recommended selection of healthy and where possible resistant seed, disinfection of seed, rotation of crops, reduction of injury or wounds in standing canes and cutting cane before it becomes overripe.

A bibliography of 39 titles is given. The majority of the illustrations have been copied from previous papers.—*J. B. Rorer.*

523. Kezer, Alvin, and Walter G. Sackett. **Beans in Colorado and their diseases.** Colorado Agric. Exp. Sta. Bull. 234. *32 p., illust.* 1918.—Bean streak is described as new. It has the general appearance of blight and the same organs are affected. The cause is not known.—Bacteriosis (*Ps. phaseoli*) is the commonest and most destructive disease. Anthracnose (*C. lindemuthianum*) and rust (*U. appendiculatus*) are of little consequence.—*D. Reddick.*

524. Lemée, E. **Dégats causés dans les jardins de la region d'Alençon par les principaux ennemis des plantes potagères et des arbres fruitiers. (Printemps-été 1917). [Damage caused in Alençon by the principal enemies of garden plants and fruit trees.]** Jour. Soc. Nation. Hort. France 19: 42–48, 61–64, 74–76. 1918.

525. McCubbin, W. A. **Tomato diseases.** Dominion Exp. Farm [Canada] Bull. 35. *16 p., 8 fig.* 1918.—Diseases common on tomatoes in southern Ontario are described and control methods given. A key based on readily recognized features is supplied.—*W. A. McCubbin.*

526. Melhus, I. E., and I. H. Vogel. **Cabbage diseases.** Iowa Agric. Exp. Sta. Circ. 46. *4 p., 3 fig.* 1918.—Popular description of blackleg, blackrot, club root and yellows with methods of control for Iowa conditions.—*D. Reddick.*

527. Miller, C. C. **Treatment of gummosis with carbolineum.** Monthly Bull. State Comm. Hort. [California] 7: 488–493. *4 fig.* 1918.—Lemon gummosis caused by *Pythiacystis citrophthora* and by *Botrytis vulgaris.* Scraping out diseased tissue and painting the wound with various substances (including mercuric chlorid and bordeaux paste) gave no better results in 1248 treatments than merely scraping out the cankered area.—Carbolineum (*Avernarius*) painted over the cankered area, on 2700 trees in 1917, and without removing the bark seems to have effected a cure. "Of the 2700 cases not one has been observed to break out again beneath the treated area."—*D. Reddick.*

528. Miller, Carroll C. **Bud curl of the lemon tree.** Monthly Bull. State Comm. Hort. [California] 7: 515–519. *Fig. 70–73.* 1918.—See Bot. Abst. 1, Entry 967.

529. Nowell, W. **Diseases of economic plants.** West Indian Bull. 16: 322–327. 1918.—Report of various diseases affecting the different economic plants of the West Indies during the year 1916. A fungous disease of *Cuscuta* was observed in Grenada which seemed to effect a useful measure of control.—*J. B. Rorer.*

530. Nowell, W. **Eel-worm disease (blackhead) of bananas.** Agric. News Barbados 17: 206. 1918.—The disease occurs in Grenada on the coarse banana known as bluggoe. The presence of the disease is most evident in plants that are reaching the bearing age. The outer leaves and partially developed bunch of fruit frequently dry up, the general appearance being that the plants lack water and nourishment. The whole root system is dead and the adjacent parts of the bulb are black and disorganized. No fungi or bacteria were uniformly present in the diseased tissues. Nematodes were regularly present and their eggs were found in the least altered and deepest seated of the discolored tissues, and in some cases the worms themselves were seen occupying the cells of undecayed tissue close to the central cylinder of the roots. The disease is probably the same as that of Jamaica and Fiji.—*J. B. Rorer.*

531. Orton, W. A. **Breeding for disease resistance in plants.** Amer. Jour. Bot. 5: 279–283. 1918.—See Bot. Abst. 1, Entry 235.

532. Oskamp, Joseph. **Winter injury of fruit trees.** Indiana Agric. Exp. Sta. Circ. 87. *12 p., 9 fig.* 1918.

533. Paul, B. H. **White pine blister rust.** New York Conserv. Comm. Bull. 15. *16 p., 6 fig. (1 colored).* 1918.—A description of the disease and of *Cronartium ribicola.* Distribu-

tion in New York. "There is already so much blister rust in New York State that it can not be stamped out immediately. But with full coöperation there is a possibility that large areas of our white pine forest land can be protected and the growing of white pine in those areas continued."—There is appended the text of a state law on the control and suppression of white pine blister rust and currant rust and of official quarantine notices.—*D. Reddick.*

534. PAULSEN, F. **A propos du court noue. [About court noue.]** Prog. Agric. et Vitic. **70**: 462–466. 1918.—A translation by P. Antoniadis of the author's report of the results of experiments conducted in Palermo and forwarded to the editors of this journal. A letter transmitting these results and containing some brief remarks in regard to them was published in the same volume of this journal, page 75, July, 1918. The results of growing different varieties of grapes on different stocks on infected soil are given. Rupestris du Lot on its own roots became severely affected with the disease. The hybrids of Berlanderi showed at the end of two years a large percentage of diseased plants. The Riparia always gave good results showing little disease even when planted in infected soil. The author believes that the "germs of infection" remain in the soil. In regard to the cause of the disease, however, he says that he believes it to arise spontaneously and to develop and spread as a form of auto-intoxication produced by possible secretions of poisonous substances which roots of certain varieties seem to absorb —As the disease is believed to remain in the soil for years, infected land should be planted to other crops for several years before planting to vines again. Application of lime, iron-sulphate and other chemicals gave only negative results.—*C. L. Shear.*

535. REIMER, F. C. **A new disinfectant for pear blight.** Monthly Bull. State Comm. Hort. [California] **7**: 562–565. 1918.—Healthy trees were wounded and the wounds smeared with a pure culture of *Bacillus amylovorus*. Disinfectants were immediately applied, except on checks, with a brush as follows: bordeaux paste; mercuric chlorid, 1:500; cresol, 5 per cent solution; mercuric cyanide, 1:500; lime-sulfur solution, 10 per cent; chlorozene, 1:500. Blight developed in every case except where mercuric cyanide was used. At 1:1000 this material is not always effective and at 1:300 it causes injury to trees.—The cyanide is not as effective as the chlorid for disinfecting metal tools.—Preliminary trials with formaldehyde (10 per cent commercial) indicate that it may be the best known disinfectant for pear blight work.—*D. Reddick.*

536. SHIRAI, MITSUTARO. **On the development of plant pathology in Japan: A brief historical sketch.** Ann. Phytopath. Soc. Japan **1**: 1–4. 1918.—See Bot. Absts. 2, Entry 302.

537. STAKEMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. **Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance?** Jour. Agric. Res. **14**: 111–124. *5 pl.* 1918.—See Bot. Abst. 1, Entry 500.

538. STEVENSON, JOHN H. **The green muscardine fungus in Porto Rico.** Jour. Dept. Agric. Porto Rico **2**: 19–32. *Pl. 1.* 1918.—*Metarrhizium anisopliae* was introduced in Porto Rico in 1911 to aid in the suppression of various injurious insects. "The conclusion seems justified that the green muscardine will not serve as a practical means of controlling the white grubs or May-beetles in Porto Rico." A bibliography of 43 titles is appended.—*D. Reddick.*

539. STEVENSON, JOHN A. **Citrus diseases of Porto Rico.** Jour. Dept. Agric. Porto Rico **2**: 43–123. *Fig. 1–23.* 1918.—A compendium of citrus diseases of the island based on four years experience. Introduction contains cultural directions, including practices for grove sanitation and spraying; the appendix contains direction for preparing fungicides and insecticides. The following diseases are described and methods of control are stated when known: damping off; crown rot (*Sclerotium rolfsii*); root rot (usually poor drainage); foot-rot or mal-di-gomma; gummosis (several types); Diplodia canker and dieback, wood rots; pink disease (*Corticium salmonicolor*); dieback or exanthema; withertip (*Colletotrichum*

gloeosporoides); scab [*Cladosporium citri*]; melanose (*Phomopsis citri*); algal leaf spot (*Cephaleuros virescens*); frenching; sooty mold; fruit rots, or shipping rots; and various other minor diseases.—*D. Reddick.*

540. Swingle, D. B., and H. E. Morris. **Crowngall injury in the orchard.** Montana Agric. Exp. Sta. Bull. 121: 121–139. *Fig. 1–6.* 1918.—A record of the behavior of 120 healthy apple trees, 12 each of 10 varieties, and 120 trees showing well developed galls of *Bacterium tumefaciens.* Nursery stock was set in 1910 and records of development kept for eight years. At this time a few galls had disappeared but most of them were growing. Very few new galls developed. No tree had died as a result of the disease and "no very great difference was apparent between the tops of the diseased and of the healthy trees, though a good observer could notice that the healthy ones had made a little better growth. The root systems of the diseased trees, however, were very inferior." The average reduction in circumference of diseased trees as compared with healthy ones was 1.58 inches.—Location of the gall, or hairy root, is of considerable importance, since lateral developments resulted in little injury and girdling galls resulted in pronounced dwarfing. The tree is weakened at the point of attachment of the gall and breaks off easily.—A review of pertinent literature is included.—*D. Reddick.*

541. Tanaka, Tyozaburo. **Notes on some fungous diseases and a new codling moth attacking the persimmon in Japan.** Monthly Bull. State Comm. Hort. [California] 7: 461–463. 1918.—Brief review of 14 papers on persimmon diseases and insects published in Japanese between the years 1905 and 1917.—*D. Reddick.*

542. Taubenhaus, J. J. **Pox, or pit (soil rot), of the sweet potato.** Jour. Agric. Res. 13: 437–450. *Pl. 51–52.* 1918.—The author reviews the past history of this disease and the publications concerning it, and then gives the results of recent investigations by himself and others.—The roots are disfigured and the yields reduced by the presence of the disease. *Cystospora batata* is considered the cause of the disease and not *Acrocystis batatas.* Contact of healthy roots with the active organism is necessary for infection. The disease is said to be equally active in wet and dry weather, but the greatest damage occurs during dry weather. The fungus is believed to be spread by soil adhering to the tools in wet weather, also by water. Rotation of crops tends to decrease the disease and is regarded as the most practical method of controlling the trouble. [See Bot. Absts. 1, Entry 446.]—*C. L. Shear.*

543. Weldon, Geo. P. Pear growing in California. Monthly Bull State Comm. Hort. [California] 7: 219–410. *Fig. 1–185.* 1918.—Chapter 13 (*p. 343–370, fig. 144–164*) is devoted to bacterial and fungous diseases of the pear and methods of control employed in California. Most of the chapter deals with pear blight caused by *Bacillus amylovorus.*—*D. Reddick.*

544. Winberg, O. E. F., G. C. Starcher, and C. L. Isbell. **Report on freeze injury to citrus trees for 1916 and 1917, with notes on orange culture in south Alabama.** Alabama Agric. Exp. Sta. Bull. 199. *26 p., 7 pl.* 1918.

PHYSIOLOGY

B. M. Duggar, *Editor*

GENERAL

545. Stiles, W. **Botany as the science of the living plant.** New Phytol. 17: 251–257. 1918.—A pedagogical article on the teaching of botany, with emphasis on the importance of the physiological aspect.—*S. M. Zeller.*

PROTOPLASM, MOTILITY

546. Schimd, Günther. **Zur Kenntnis der Oscillarienbewegung.** [**Movement in Oscillaria.**] Flora 11-12: 327–379. 1918.

DIFFUSION, PERMEABILITY

547. HARVEY, R. B., AND R. H. TRUE. **Root absorption from solutions at minimum concentrations.** Amer. Jour. Bot. 5: 516–521. *Fig. 1–2.* 1918.—The equilibrium of electrolytes in respect to plants grown in water culture was found to depend on the particular plant used, and, when the concentration lay between the toxic limit and the essential limit, it was independent of the salt used, the concentration of the electrolyte, or the volume of the solution. The CO_2 equilibrium of the air, the rate of cleavage of iron-producing compounds, and the reabsorption of the ions determined the electrolyte content at the point of equilibrium.—*R. W. Webb.*

548. OSTWALD, WOLFGANG. **Zur Theorie der Osmose und Ultrafiltration kolloider Lösungen. [The theory of osmosis and ultrafiltration of colloidal solutions.]** Kolloid-Zeitschr. 23: 68–78. 1918.

549. RENNER, O. **Versuche zur Mechanik der Wasserversorgung. [The mechanics of water absorption.]** Ber. Deut. Bot. Ges 36: 172–179. 1918.—Renner answers Nordhausen's criticism (Berichte, 1916) of his earlier work (Flora, 1911) on water movement in plants, and gives a number of experiments to confirm, in the main, his earlier generalizations. He also gives a brief statement on the "saturation deficit" and the "energetics of water movement" in plants.—*William Crocker.*

550. RIPPEL, AUGUST. **Semipermeabel Zellmembranen der Pflanzen. [Semipermeable cell membranes.]** Ber. Deut. Bot. Ges. 36: 202–218. 1918.

WATER RELATIONS

551. JOHNSTON, EARL S. **A simple non-absorbing atmometer mounting.** Plant World 21: 257–260. *Fig. 1.* 1918.—The difficulties attending the filling of non-absorbing atmometers are briefly discussed. A simple modification of the Shive mounting is suggested. This consists in omitting the longer tube extending to the top of the cup and inserting in the shorter tube a tube of slightly smaller diameter drawn down to a capillary tube and bent in the form of a U. The open end of the U just extends into a small quantity of mercury which is placed in the space between the larger and smaller tube. The mercury is prevented from escaping by means of a small piece of rubber tubing fitted around the joint between the two tubes at the place of insertion.—*Henry Schmitz.*

552. PEARSON, G. A. **The relation between spring precipitation and height growth of western yellow pine saplings in Arizona.** Jour. Forestry 6: 667–689. *Fig. 1–3.* 1918.—It is found that spring precipitation is the most important of the factors studied in the height growth of this species.—*R. W. Webb.*

MINERAL NUTRIENTS

553. OIJEN, L. W. H. VAN. **Zur Kenntnis der antagonistischen Salzwirkungen. [Antagonistic salt action.]** Biochem. Zeitschr. 87: 418–424. 1918.

554. PLUMMER, J. K. **Availability of potash in some common soil-forming minerals and effect of lime upon potash absorption by different crops.** Jour. Agric. Res. 14: 297–315. *Pl. 8, Fig. 1–4.* 1918.—Employing pot cultures of oats, soy beans, rye, and cowpeas, which were supplied with potash in the form of biotite, muscovite, orthoclase, microline and potassium sulfate, the author found that the weight of the dry matter produced varied with the source of the potash. Potassium sulfate gave the greatest dry weight, with biotite, muscovite, orthoclase, and microline following in descending order. The effects of lime used in conjunction with the different materials is also noted.—*R. A. McGinty.*

555. Pollock, J. B. **Blue green algae as agents in the deposition of marl in Michigan lakes.** Rept. Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—Marl beds composed largely of concretionary pebbles are deposited in association with several Cyanophyceae and may be deposited in the total absence of *Chara* which was supposed to be the chief agent in marl deposition. These pebble marls are characteristic of shallow lakes and are a purer form of marl than is generally deposited by *Chara.* The rate of deposition varies widely in different beds, however, the maximum rate is probably one foot in seventy-five years. It is very probable that minute water organisms of various kinds absorb the carbon dioxide from the water for metabolic processes and leave the calcium carbonate to precipitate upon the twigs, plants, or bottom of the pool. [See Bot. Absts. 2, Entry 623.]—*R. P. Hibbard.*

556. Stoklasa, Julius. **Über die Verbreitung des Aluminium-Ions in der Pflanzenwelt. [The distribution of aluminium ions in diverse plants.]** Biochem. Zeitschr. 88: 292–322. 1918. —Xerophytes contain only a small aluminium content, at times only traces, in the various organs of the plant. Hydrophytes and hygrophilous plants are in general characterized by a relatively high aluminium content. Among many plants accumulating aluminium may be mentioned species of *Chara, Bryopsis,* species of brown and red marine algae, various species of the Filices, Equisetales, and Lycopodiales. Among higher plants in bog habitats containing high aluminium content are species of *Scirpus, Polygonum, Rumex,* etc. The author considers that the hygrophilous plants mentioned exhibit a quantitative selection capacity for aluminium ions, which are stored particularly in the subterranean organs. Mesophytes in general contain relatively small amounts of aluminium, unless they grow in moist situations, when the quantity is then noticeably increased.—*B. M. Duggar.*

557. Weevers, Th. **Die physiologische Bedeutung des Kaliums in der Pflanze. Schlusserwiderung auf die Mitteilung Stoklasas. [The physiological significance of potassium in the plant.]** Biochem. Zeitschr. 89: 281–282. 1918.

PHOTOSYNTHESIS

558. Ursprung, A. **Ueber die Absorptionskurve des grünen Farbstoffes lebender Blätter. [The absorption curves of green pigments in living leaves.]** Ber. Deut. Bot. Ges. 36: 73–85. 1918.

559. Ursprung, A. **Ueber die Bedeutung der Wellenlänge für die stärkebildung. [Wave length and starch formation.]** Ber. Deut. Bot. Ges. 36: 86–100. 1918.

560. Ursprung, A. **Energiekurven des vom Farbstoff grüner Blätter absorbierten Lichtes. [Curves of radiant energy absorbed by green leaves.]** Ber. Deut. Bot. Ges. 36: 111–121. 1918.

561. Ursprung, A. **Ueber das Vorhandensein einer photochemischen Extinktion beim Assimilationsprozess. [The assimilation process and photochemical extinction.]** Ber. Deut. Bot. Ges. 36: 122–135. 1918.

METABOLISM (GENERAL)

562. Albro, F. W. **Chemical constants of avocado oil.** Ann. Rept. California Avocado Assoc. 1917: 92–93. 1918. [See Bot. Absts. 1, Entry 507.]

563. Biedermann, W. **Mikrochemische Beobachtungen an den Blattzellen von Elodea. [Microchemical observations on leaf cells of Elodea.]** Flora 11-12: 560–605. 1918.

564. Black, O. F. **Calcium oxalate in the dasheen.** Amer. Jour. Bot. 5: 447–451. 1918. —Plants which produce calcium oxalate in bundles of fine, needle-like crystals packed in cells, when eaten raw invariably cause a burning sensation in the mouth. This work shows that calcium oxalate crystals are the cause of the acrid taste of the dasheen, and suggests that the plant be not discarded from the vegetable food supply, inasmuch as the acrid flavor can be removed by proper cooking.—*R. W. Webb.*

565. Boas, Friedrich. **Weitere Untersuchungen über die Bildung löslicher Stärke bie Schimmelpilzen mit besonderer Berücksichtigung der Frage nach der Eiweisssynthese der Schimmelpilze. [Concerning the formation of soluble starch by fungi with special reference to protein synthesis.]** Biochem. Zeitschr. 86: 110–124. 1918.—The formation of soluble starch by *Aspergillus niger* depends upon the hydrogen-ion concentration of the medium. Czapek's work on the synthesis of proteins from the amino acids by fungi is critically examined in the light of the hydrogen-ion concentration of the culture media. It is found that when the media has a sufficient hydrogen-ion concentration *Aspergillus niger*, *Penicillium*, and *Cladosporium* produce greater dry weights of mycelium when ammonium sulfate is the source of nitrogen than when amino acids are substituted.—*H. Schmitz.*

566. Ellis, Mary T. **Contributions to our knowledge of the plant sterols. I. The sterol content of wheat (Triticum sativum).** Biochem. Jour. 12: 160–172. 1918. **II. The occurrence of phytosterol in some of the lower plants.** Biochem. Jour. 12: 173–177. 1918.

567. Fellenberg, Th. von. **Über die Konstitution der Pektinkörper. [The constitution of pectin bodies.]** Biochem. Zeitschr. 85: 118–161. 1918.—An extensive account of pectin bodies of diverse origin, their physical properties, constitution, derivatives, and the formation of fruit jellies.—*B. M. Duggar.*

568. Goerrig, Elisabeth. **Vergleichende Untersuchungen über den Carotin- und Xanthophyllgehalt grüner und herbstlich gelber Blätter. [Carotin and xanthophyll in green and in autumn leaves.]** Beih. Bot. Centralbl. 35: 342–394. 1918.—Colorimetric determinations were made of the carotin and xanthophyll content of green leaves at the beginning of the autumn coloration, and of yellow leaves at the height of autumn coloration. The yellow pigments were extracted and separated according to Willstätter's methods. The carotin and xanthophyll extracts, diluted to 50 cc. and 100 cc., respectively, were compared with a 0.2 per cent, solution of potassium bichromate.—It was found that carotin increased or decreased in leaves during yellowing in autumn, depending upon the genus and upon weather conditions. During a clear warm autumn the carotin content of leaves of the following plants increased about twofold: *Aesculus hippocastanum, Acer platanoides, Fagus sylvatica, Platanus orientalis, Parrotia persica, Vitis coignetiae.* While the carotin content decreased greatly in leaves of the following plants: *Salix babylonica, Maclura aurantiaca, Broussonetia papyrifera.* —In a cold autumn with early frost it was found in all cases, with the exception of *Acer platanoides*, that there was less carotin and less xanthophyll in the yellow than in the green leaves.—*Sophia Eckerson.*

569. Hammersten, Olof. **Einige Bemerkungen über das Erbsenlegumin. [Legumin of peas.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 85–104. 1918.

570. Jaffa, M. E., and F. W. Albro. **Studies on the composition and nutritive value of some sub-tropical fruits.** Ann. Rept. California Avocado Assoc. 1917: 85–91. 1918. [See Bot. Abst. 1, Entry 533.]

571. Kauffman, C. H. **The Agaricaceae of Michigan.** Michigan Geol. Biol. Survey Pub. 26 (Biol. Ser. 5). *Vol. 1, xxvii + 924 p. Frontispiece and fig. 1–4.* 1918. [Vol. 2, *in press.*] See Bot. Absts. 2, Entry 627.

572. Kelly, W. P. **A new sugar in the avocado.** Ann. Rept. California Avocado Assoc. 1917: 92. 1918. [See Bot. Absts. 1, Entry 537.]

573. Kylin, Herald. **Ueber die Fucosanblasen der Phaeophyceen. [Fucosan vacuoles.]** Ber. Deut. Bot. Ges. 36: 10–19. 1918.—Hansteen noted that granules, as he called them, accumulate about the chromatophores of Phaeophyceae during carbon-assimilation. He thought they were produced by the chromoplasts and were the first visible product of carbon-

assimilation. On this basis he called them fucosan granules. Kylin has made a rather extensive study of these bodies, the results of which are summarized in the article here reviewed. He finds that these bodies are vacuoles rather than granules and, while they are probably formed by the chromoplast in connection with carbon-assimilation, they are not made up in the main of carbon-synthate. He thinks he has shown that dextrose is the first carbon-synthate of the Phaeophyceae and that this is condensed to laminarin. These vacuoles may be the means by which the synthate leaves the plastid, but it is not stored in them. On the contrary it rapidly diffuses from them into the cytoplasm. He thinks these vacuoles, especially the older ones, are filled with substances resembling tannin but differing from true tannins in some respects. He considers these tannin-like substances as meaningless waste products, which upon oxidation give rise to the brown pigment of this group of plants, phycophaein, which was formerly considered a pigment of the chromatophores.—*Wm. Crocker.*

574. Meyer, Arthur. **Eiweiszstoffwechsel und Vergilben der Laubblätter von Tropaeolum majus. [Loss of chlorophyll.]** Flora 11-12: 85-127. 1918.—Meyer notes that in *Tropaeolum majus* growing in pots in a greenhouse the young leaves at the top of the stem are dark green while the progressively older ones down the stem are green, bright green, yellow green, yellow, and bright yellow, and finally the oldest ones on the plant are wilting. Meyer points out that this change in color is due to the gradual decomposition of the two chlorophylls, while the carotin and xanthophyll remain constant, as this change progresses the chloroplasts become smaller and in the later stages are shriveled granular masses with balls of excreted material about them. With the gradual loss of chlorophyll goes a similar decomposition of the proteins of the chloroplast. It should be mentioned that Meyer adduces evidence for the view that the chloroplast is the main organ for the storage of the proteins manufactured in the foliage leaf, if indeed not the very seat of protein manufacture. The amount of carbohydrates in the leaves also falls with age. Meyer found that when the leaves are placed in darkness no reduction occurs in the proteins until the carbohydrates are greatly reduced by respiration. The decomposition of the proteins then begins, he believes, as a source of carbon chains for respiration. He claims there is no loss of nitrogen from the leaf during this change but that the nitrogen residue remains in the leaf, while the carbon chain of the protein is used for respiration. He apparently gives the following interpretation of the process. As the leaves become older they become weakened. In this weakened condition the photosynthetic power falls. This leads to a great reduction in the amount of carbohydrates in the leaf and finally to the decomposition of the proteins of the chloroplasts as a carbon source for respiration. This decomposition of the proteins is accompanied by the decomposition of the chlorophyll and the change in color.—*Wm. Crocker.*

575. Meyer, Arthur. **Das Assimilationssekret von Vaucheria terrestris. [Assimilation in Vaucheria terrestris.]** Ber. Deut. Bot. Ges. 36: 235-241. 1918.

576. Meyer, Arthur. **Die angebliche Fettspeicherung immergrüner Laubblätter. [Fat storage in evergreen leaves.]** Ber. Deut. Bot. Ges. 36: 5-10. 1918.—A number of investigators have claimed that there is a considerable storage of fats in evergreen leaves during the winter. Meyer finds that the droplets that were supposed by these former workers to be fat droplets are not fat and that the total volume of these does not rise and fall with winter and summer, but that it increases continuously with the age of the leaf. He speaks of the droplets as "mesophyllsekret" and points out that little is known of the origin and composition of them. Some of the forms studied were: *Ilex aquifolium, Taxus baccata, Vinca minor.* The methods used by Meyer, as well as by former workers, are exclusively microchemical—*Wm. Crocker.*

577. Molisch, Hans. **Über den microchemischen Nachweis und die Verbreitung gelöster Oxalate im Pflanzenreiche. [Dissolved oxalates in plants.]** Flora 11—12: 60-70. 1918.—Molish finds dissolved oxalates appearing rather generally distributed in phanerogams. All investigated species of the following families bore much dissolved oxalate: Polygonaceae, Chenopodiaceae, Amarantaceae, Aizoaceae, Begoniaceae, Melastomaceae, Oxalidaceae, Can-

naceae, and Marantaceae. While in most cases this chemical character, like many other chemical characters, runs by families, this is not always the case. In certain families some genera are very rich in dissolved oxalates while other genera contain little or none. This is true of Commelinaceae and Cactaceae.—*Wm. Crocker.*

578. MOLISCH, HANS. **Beiträge zur Mirkochemie der Pflanzen. No. 10. Ueber Kieselkörper in der Epidermis von Campelia Zanonia. No. 11. Kristallisiertes Karotin in der Nebenkrone von Narcissus poeticus. [Microchemistry of plants. No. 10. Silicia bodies in the epidermis of Campelia Zanonia. No. 11. Crystalized carotin in the corolla of Narcissus poeticus.]** Ber. Deut. Bot. Ges. 36: 277–282. 1918.

579. RHEIN, M. **Über den Abbau des Tyrosins durch Bact. coli phenologenes nebst einer Notiz über die Zusammensetzung der Harnphenole des Menschen. [The decomposition of tyrosin by Bacterium coli phenologenes.]** Biochem. Zeitschr. 87: 123–128. 1918.

580. STEWART, ALFRED W. **Recent advances in organic chemistry.** *3rd ed. 350 p., 1 chart.* Longmans, Green and Co.: London, 1918.—The third edition of this work exhibits much new material, although only eight years have elapsed since the previous edition. Physiologists interested in the biochemical aspects of the subject will find particularly applicable the extensive treatment of such sections as the following: V, Rubber; VI, The Alkaloids; VII, The Polypeptides; VIII, The Chlorophyll Problem; IX, The Anthocyanins; and X, Some Theories of the Natural Synthesis of Vital Products. The author makes it clear that the book is not intended merely as a compilation of facts, but rather as a work at once critical and suggestive of the directions of research.—*B. M. Duggar.*

581. WOLF, C. G. L. **Contributions to the biochemistry of pathogenic anaerobes. V. The biochemistry of Vibrion septique.** Jour. Path. and Bact. 22: 115–128. 1918.—This organism attacks primarily carbohydrates. Although growing freely in the absence of carbohydrate and producing gas, the addition of carbohydrate greatly accelerates the metabolic process. In gas-forming capacity it falls within the range of *Bacillus welchii*, but acid production is not so marked as in the latter. The proteolytic action is comparable with that of *B. welchii.* The addition of a small amount of fresh tissue to a medium affording little growth results in stimulating growth activity.—*B. M. Duggar.*

METABOLISM (NITROGEN)

582. DAVISSON, B. S. **Ammonia and nitric nitrogen determinations in soil extracts and physiological solutions.** Jour. Indust. and Eng. Chem. 10: 600. 1918.—The results show that a modification of the aeration method as employed by Folin in the determination of ammonia is applicable when large volumes of soil extracts and physiological solutions are used.—*R. W. Webb.*

583. HUTCHINSON, H. B. **The influence of plant residues on nitrogen fixation and on losses of nitrate in the soil.** Jour. Agric. Sci. 9: 92–111. *Fig. 1–3.* 1918.—Experiments give evidence that the nitrogen content of sand or soil may be appreciably increased by the activity of *Azotobacter* when dextrose and saccharose are supplied as a source of energy. Plant residues added to soil cultures gave similar results. In laboratory experiments there was a gain of nearly 6 mg. of N per gram of plant residue, and in pot experiments there was realized a gain of 9 mg. per gram of substance added. Besides this source of energy supply there is also necessary a suitable temperature and a supply of phosphates and calcium carbonate. Under the most favorable circumstances for nitrogen fixation there is, after the addition of the organic materials, a period of activity involving processes adverse to growth, and before these have run to completion it is not advisable that a crop be introduced.—*S. M. Zeller.*

584. SEN, J. N. **The influence of potsherds on nitrification in the Indian alluvium.** Jour. Agric. Sci. 9: 32–42. *Fig. 1–4.* 1918.—The influence of different percentages of potsherds

in soils on the formation of nitrates was studied. Oxygen and nitrates were estimated in the solution which percolated from jar cultures. The nitrates and oxygen were more concentrated in those cultures containing potsherds. In experiments in lysimeters samples of soil were taken from different layers of soil every fortnight and the results are shown graphically. In these cases also an increase in the quantity of potsherds seems to increase the proportion of nitrate.—*S. M. Zeller.*

585. Euler, Hans. **Über Enzymbildung. [Enzyme formation.]** Biochem. Zeitschr. 85: 406–417. 1918.—Data are given substantiating the theory that the formation of invertase does not occur through a splitting off or secretion by the protoplast or other cell substances but through a synthesis. The energy liberated through fermentation is essential to this synthesis.—*H. Schmitz.*

586. Euler, Hans, and Olof Svanberg. **Untersuchungen über die chemische Zusammensetzung und Bildung der Enzyme. XV. Neue Messungen an Bact. acidi lactis (Streptococcus lactis). [The chemical composition and formation of enzymes. New measurements with Bacterium acidi lactis.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 176–184. *Fig. 1-2.* 1918.

587. Hammersten, Olof. **Studien über Chymosin- und Pepsinwirkung. IV. Die Wirkung der Enzyme auf Natriumcaseinate. [The action of chymosin and pepsin upon sodium caseinate.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 33–77. 1918.

588. Hammersten, Olof. **Studien über Chymosin- und Pepsinwirkung. V. Wirkung der Enzyme auf Erbsenlegumine. [The action of chymosin and pepsin upon legumin of peas.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 105–147. 1918.

589. Ivanov, N. **On the nature of the proteolytic enzyme of yeast.** Biochem. Jour. 12: 106–119. 1918.—The estimation of nitrogen in protein was obtained by the Stutzer method, and the quantity of amino-groups by the Van Slyke method. Lebedev's dried yeast and hefanol (a Munich preparation of dried yeast) were used as the sources of enzymes. Acidity produced by monopotassium phosphate considerably increases the rate of decomposition of protein up to the peptone stage. If the temperature is lowered (from 46°C. to 34°C.) peptase action continues so that practically all of the peptone is converted into amino-acids after seven days. At a temperature of 75° peptase action is entirely suppressed, and 19 per cent alcohol similarly destroys the activity of this enzyme. Alkalinity produced by dipotassium phosphate inactivates the protease and activates the peptase.—*S. M. Zeller.*

590. Jacoby, Martin. **Über Bakterien-Katalase. [Catalase in bacteria.]** Biochem. Zeitschr. 89: 350–354. 1918.

591. Jacoby, Martin. **Über die Einwirkung der Aldehyde auf die Urease. [The action of aldehydes upon urease.]** Biochem. Zeitschr. 85: 358–364. 1918.—Aldehydes inhibit urease action, probably due to the formation of an aldehyde-enzyme combination.—*B. M. Duggar.*

592. Jacoby, Martin. **Über Fermentbildung VI, VII. [Enzyme formation.]** Biochem. Zeitschr. 88: 35–42. 1918.—See Bot. Absts. 2, Entry 836.

593. Jacoby, Martin. **Über die Wirkung der Cyanhydrine auf Fermente und Bakterien. [The action of cyanhydrin on ferments and bacteria.]** Biochem. Zeitschr. 87: 129–134. 1918.

594. Lebedev, Alexandre. **Sur la fermentation de l'acide glyoxylique. [Fermentation of glyoxalic acid.]** Biochem. Jour. 12: 81–86. 1918.—Experiments show that the action of yeast on glyoxalic acid is very marked. As far as this acid is concerned, the products of its decomposition, excepting carbon dioxide and acetaldehyde, are an open question. Alcohol

is probably a product if there is a simple reduction of acid as in the reaction: $CHO.CO_2H + 8H = 2H_2O + CH_3.CH_2OH$. Then acetaldehyde follows as an oxidation product. The ethyl alcohol which is formed anaerobically in plant tissues does not always result from sugar, and among other organic acids glyoxalic acid may have to be added to the probable sources of this alcohol.—*S. M. Zeller.*

595. LEBEDEV. ALEXANDRE. **Sur la formation des éthers phosphorés pendant la fermentation alcoolique. [Formation of phosphoric esters in alcoholic fermentation.]** Biochem. Jour. 12: 87-92. 1918.—Fifty grams of yeast were added to a nutrient solution containing 100 grams saccharose, 35 grams monosodium phosphate, 17 grams disodium phosphate and 1 cc. of toluene in 500 grams of water. By preparations of p-bromphenylhydrazone, p-bromphenylosazone, and phenylosazone, it was demonstrated that a mixture of phosphoric esters was produced during fermentation. These esters differ from the hexose-phosphate which the author has discussed in a previous paper.—*S. M. Zeller.*

596. MEYERHOF, OTTO. **Über das Gärungscoferment im Tierkörper. [The co-ferment of alcoholic fermentation in the animal body.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 1-32. 1918.

597. MEYERHOF, OTTO. **Zur Kinetik der zellfreien Gärung. [The kinetics of cell-free alcoholic fermentation.]** Hoppe-Seyler's Zeitschr. Physiol. Chem. 102: 185-225. *Fig. 1-7.* 1918.—This paper concerns itself with alcoholic fermentation along the general lines developed by Harden and Young. He notes an induction period characteristic of yeast sap after the addition of sugar. At first fermentation shows a strong increase due to the free phosphate contained in the sap; the rise in the velocity of the reaction gradually develops, more slowly the higher is the concentration of phosphate at the beginning. He has also been able to develop a salt action due to phosphates or other salts. When an ester of hexose phosphoric acid is added the rise in the fermentation curve is more rapid, and is not dependent upon the hexose set free. With increase in the co-ferment the fermentation curve rises, and fermentative action corresponds more nearly to the concentration of the co-ferment than to any relation to zymase content. The inhibition of zymase and of hexose phosphatase in the sap are similar. On the other hand, in dry yeast the fermentation of the hexose phosphate is inhibited by smaller concentrations, and these lie between those for the sap and those inhibiting action in the living cells.—*B. M. Duggar.*

ORGANISM AS A WHOLE

598. BÜSGEN, M. **Biologische Studien mit Botrytis cinerea. [Biological studies of Botrytis cinerea.]** Flora 11-12: 606-620. 1918.

599. KIDD, F., AND C. WEST. **Physiological predetermination: the influence of the physiological condition of the seed upon the course of subsequent growth and upon the yield. II. Review of literature.** Ann. Appl. Biol. 5: 112-138. *Fig. 1-2.* 1918.—A review of the literature on this subject reveals two groups of environmental conditions influencing the seed while on the parent plant. First, the effect of the position of the seed is reflected in the size of this structure, and is independent of external conditions. Second, the environment as affecting the parent plant may, however, influence the course of development of the seeds produced in subsequent generations.—*S. M. Zeller.*

600. SINNOTT, EDMUND W. **Factors determining character and distribution of food reserves in woody plants.** Bot. Gaz. 66: 162-175. *2 fig.* 1918.—See Bot. Absts. 1, Entry 580.

GROWTH AND DEVELOPMENT, REPRODUCTION

601. KLEBS, GEORG. **Über die Blütenbildung von Sempervivum. [Conditions affecting flower development.]** Festschrift, Stahl. *P. 128-151.* Jena, 1918.—Klebs divides the process of flower formation by the rosettes of *Sempervivum Funkii* and *S. albidum* into three dis-

tinct successive steps: (1) production of the condition of ripeness to flower (blühreife Zustande), (2) formation of flower primordia and (3) development of flower clusters and elongation of the axis. Light is the dominant factor in determining all three of these stages of development.—In the first and third, light is effective entirely through its photosynthetic action and its effectiveness rises with its energy value. Higher temperatures counteract light by favoring dissimilation. Accordingly the effect of high temperatures can be in part annulled by increased light intensities. It is the balance of carbon-assimilation over dissimilation that furthers the development of these two stages. Klebs finds that at lower temperatures (about 6°C.) both these stages can be attained in darkness although in the last it gives a far less extensive inflorescence. Klebs thinks this is likewise tied up with a balance in favor of available carbon synthate. The lower temperature gives low respiration and leads to the accumulation of soluble sugars by the hydrolysis of insoluble carbohydrates.—In the second step, formation of flower primordia, light has two distinct and antagonistic effects. The one which favors the process is due to the photosynthetic activity of the light and is a function of the less refrangible rays of the spectrum. The other, which inhibits the process or even annuls the ripe to flower condition must at present be termed a stimulus effect and it is a function of the less refrangible blue rays. Diffuse daylight is relatively injurious to primordia development because of the high percentage of blue violet rays it contains. The Osram light and direct sunlight favor this development because of the dominance of the red rays.—Klebs says it is still an unanswered question whether inflorescence development in other forms and in plants in general can be divided into these three distinct steps with similar light effects in each step. He suggests some facts as evidence that such may be the case. Klebs past work has done much to show that the formative effects of conditions on plants is largely through the nutrient effects of these conditions. Thus the formative effect of light is explained in a large part by its effect on carbon-assimilation, but Klebs points out here as in his older work that there is also a specific formative action of the blue rays as yet unexplainable on the nutrient basis.—*W. Crocker.*

602. Kniep, Hans. **Über die Bedingungen der Schnallenbildung bei den Basidiomyzeten. [Conditions for beak formation in the Basidiomycetes.]** Flora 11-12: 380–395. 1918.

603. Küster, Ernst. **Über rhythmisches Dickenwachstum. [Rhythmical secondary growth thickening.]** Flora 11-12: 621–640. 1918.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

604. Möbius, M. **Über Orientierungsbewegungen von Knospen, Blüten und Früchten. [Movements of orientation in buds, flowers, and fruits.]** Flora 11—12: 396–417. 1918.

605. Slator, A. **Some observations on yeast growth.** Biochem. Jour. 12: 248–258. 1918. —In this paper a method of measuring the logarithmic constant of growth and the generation-time of micro-organisms is described, and the importance of such measurements in an investigation of the growth of these organisms and of the chemical action brought about by them is discussed.—*S. M. Zeller.*

606. Woker, Gertrud. **Zur Physik der Zellkernteilung. [The physics of cell division.]** Zeitschr. Allgem. Physiol. 18: 39–57. *Fig. 1-14.* 1918.

607. Zollikofer, Clara. **Ueber das geotropische Verhalten entstärkter Keimpflanzen und den Abbau der Stärke in Gramineen-koleoptilen. [Statolith starch.]** Ber. Deut. Bot. Ges. 36: 30–38. 1918.—Miss Zollikofer finds that the statolith starch of seedling organs is relatively readily removed by periods of illumination followed by periods of darkness, but it is persistent in organs grown continually in darkness. The persistence of the statolith starch is a function of the degree of etiolation. This the writer considers a biological adaptation. By growing seedlings of *Fagates erecta* and seedlings of other Compositae in light one to four

days followed by three to four days of darkness, hypocotyls were obtained that bore no statolith starch. These hypocotyls were still growing and capable of phototropic movement but incapable of geotropic movement. Light rendered them geo-sensitive only after it had produced statolith starch. Working by similar methods the author shows a close relation between the amount of mobile starch and geo-sensitivity in the coleoptile of grasses.—*Wm. Crocker.*

GERMINATION, RENEWAL OF ACTIVITY

608. MOORE, W., AND H. K. HAYES. **A new maize secret.** Jour. Agric. Victoria **16**: 123–124. 1918.—The fumes of nitrobenzine are reported to increase the rate as well as the percentage of germination.—*B. M. Duggar.*

REGENERATION

609. FIGDOR, WILHELM. **Zur Kenntnis des Regenerationsvermögens von Crassula multicava Lem. [Regeneration capacity in Crassula multicava.]** Ber. Deut. Bot. Ges. **36**: 241–246. 1918.

610. MAGNUS, WERNER. **Wund-Callus und Bakterien-Tumore. [Wound-callus and bacterial tumors.]** Ber. Deut. Bot. Ges. **36**: 20–29. 1918.—Polar difference in wound-callus formation has often been observed in stems and less frequently in root structure. Magnus finds that segments of the root of a half long carrot with which he worked produced a wound-callus on the morphologically apical face but not on the basal face. This occurred whether the apical face was oriented upward or downward in the moist chamber. The callus starts at the cambium ring and spreads centripetally. When the apical face is infected with *Bacterium tumefaciens* the callus development is much greater. When the basal face is infected there is a considerable development of tumors on that face and this acts in a correlative way to inhibit the normal tumor development on the apical face. Mangus also worked with a long fodder carrot. While infection in this form increased the callus development on the apical face of the segments tenfold, it induced very little tumor development on the basal face and accordingly showed little correlative effect in inhibiting the normal callus development on the apical face.

Magnus offers evidence for the view that the tumor-inducing organism in plants is not identical with that in man. He also suggests that certain conclusions of Blumenthal and Hirschfield on the effect of *Diplococcus* on tumor formation in plants may be wrong because they failed to recognize the polar disposition to callus formation in plants. He thinks the studies on tumor formation in plants will finally throw much light on cancer development.—[See Bot. Absts. 2, Entry 777.]—*Wm. Crocker.*

LIGHT RELATIONS

611. LEHMANN, ERNST. **Ueber die minimal Belichtungszeit welche die Keimung der Samen von Lythrum salicaria auslöst. [Minimum illumination interval for the germination of seed of Lythrum.]** Ber. Deut. Bot. Ges. **36**: 157–163. 1918.—Lehmann finds that in a germinator at 30°C. 0.1 second's illumination with 730 H. K. is sufficient to cause 50 per cent of the seeds of *Lythrum salicaria* to germinate within twenty-four hours, whereas only 6 to 7 per cent germinate in similar condition in darkness and not more than 7 per cent after ten days.—*Wm. Crocker.*

612. SHAMEL, A. D. **Some effects of shading lemon trees.** Monthly Bull. California State Comm. Hort. **7**: 441–451. *4 fig. 8 tables.* 1918. [See Entry Bot. Absts. 1, Entry 554.]

TOXIC AGENTS

613. Knaffl-Lenz, E. von. **Beitrag zur Theorie der Narkose. [The theory of narcosis.]** Arch. Exp. Path. und Pharm. 84: 66–87. *1 fig.* 1918.—It is shown that volatile water-soluble narcotics are absorbed by gelatine gels in the absence of lipoids, and such gels swell as a result. Water-insoluble petroleum ether is not absorbed and therefore produces no swelling. The author concludes, contrary to Traube, that narcotics diminish swelling effects rather than increase such effects.—*B. M. Duggar.*

614. Wehmer, C. **Leuchtgaswirkung auf Pflanzen, 4. Die Wirkung des Gases auf das Wurzelsystem von Holzpflanzen; Ursache der Gaswirkung. [The effects of illuminating gas upon plants.]** Ber. Deut. Bot. Ges. 36: 140–149. 1918.—Wehmer has studied the effect of passing continuous streams of illuminating gas through the soil bearing potted herbaceous as well as three to seven year old wooded plants. There was a great difference in the amount of injury according to the stage of development. In the spring the trees were entirely killed in a relatively short time. This is in general the sort of reaction given by the actively growing herbaceous forms at all times. In late summer and early fall the injury is less marked and is shown mainly by leaf fall, while in the dormant period of winter the trees are very resistant. Where investigated the embryo in the resting seed and the seedling stage proved very sensitive. Cuttings stood in gas-impregnated water showed, with few exceptions (*Ilex*) seasonal variations in sensitiveness similar to the plants rooted in soils. In spite of this the author thinks that injury to parts above the soil is in part a secondary result of root injury. The injury is due to toxic constituents of the gas and not to mere displacement of oxygen by the gas as Sorauer has suggested. The toxic constituents increase or decrease with the conditions that lead to an increase or a decrease in the odor producing materials. The author promises a later paper on the toxic constituents.—*Wm. Crocker.*

MISCELLANEOUS

615. Brenchley, W. E. **Buried weed seeds.** Jour. Agric. Sci. 9: 1–31. 1918.—The viability was tested of weed seeds, which had been buried at various depths for known lengths of time and under known field conditions. The results show how closely the flora derived from such buried seeds is associated with the history of the land, i.e., permanent grassland is devoid of arable weeds; continual close grazing hinders seed production and reduces the number of seeds that become buried. Mowing may allow of the ripening of early species. Permanent grasslands have a distinct buried flora, which is chiefly pasture plants while grassland that has once been arable contains a large number of seeds common to both pasture and arable lands. True arable weed seeds may be found in soil which has been grassed over for at least fifty-eight years. The seeds survive best in the lower layers of soil.—*S. M. Zeller.*

616. Gortz, Otto. **Ueber einige durch schmarotzende Cuscuta hervorgerufene Gewebeveränderungen bei Wirtspflanzen. [Structural changes induced in the host by Cuscuta.]** Ber. Deut. Bot. Ges. 36: 62–72. 1918.

617. Hutchinson, H. B., and A. C. Thaysen. **The non-persistence of bacterio-toxins in the soil.** Jour. Agric. Sci. 9: 43–62. *Fig. 1–4.* 1918.—Seven soils were examined to ascertain whether partial sterilization effects may be due to the destruction of bacterio-toxins in the soil. Untreated extracts of the soils differed greatly in their suitability for the growth of *Bacillus prodigiosus*. Heating the extracts lowered the bacterial count, while the addition of antiseptics to the extracts was usually more favorable for bacterial growth than the untreated extracts. Additions of peptone to unfavorable extracts rendered them favorable media. Extracts of very poor untreated soils were inoculated with a common soil organism, *B. fluorescens liquefaciens*, and there was no evidence of toxicity of the soil. The value of the extract of an acid heath soil was distinctly increased after heating. By the continual growth of *B. prodigiosus* on a solution an unfavorable medium is obtained, due to diminution of food value and an increase of toxins. This substance is stable to heat and does not resemble the toxins which are alleged to occur in the soil.—*S. M. Zeller.*

618. KOLKWITZ, R. **Über die Schwefelbakterien-Flora des Solgrabens von Artern. [Sulphur bacterial flora.]** Ber. Deut. Bot. Ges. 36: 218–224. 1918.

619. NEGER, F. W. **Die Wegsamkeit der Laubblätter für Gaze. [Aeration systems of leaves.]** Flora 11-12: 152–161. 1918.—Neger has earlier spoken of two types of leaves on the basis of the nature of their intercellular systems—heterobasic and homobasic. In a recent article he compares a heterobasic leaf to a house with thousands of rooms lacking communicating doors, and a homobasic leaf to a similar house with communicating doors present and all open. In the first type the intercellular system is divided into many small isolated regions by the smaller veins with the resulting possibility of different air pressure existing in each, while in the second the whole intercellular system of the leaf is connected and therefore the same pressure exists throughout. Most plants with flat leaves have heterobasic leaves and the size of the individual chambers vary considerably. In various species of *Quercus* they run from 1/840 to 1/1400 sq. cm. and in *Syringa vulgaris* from 1/8 to 1/10 sq. cm. In the same species shade leaves have larger chambers than sun leaves. The following trees and shrubs have homobasic leaves *Evonymus japonica, Ilex aquifolium, Prunus laurocerasus, Hedera helix, Ardisia crispa* and all needle-bearing trees and shrubs. When injured by smoke the homobasic leaves show the injury to the whole leaf due to the gases distributing themselves throughout the whole intercellular system, while the heterobasic leaves show the injury in spots corresponding to individual intercellular chambers.—*Wm. Crocker.*

620. RODENWALD, H. **Der Vegetationsversuch. [Vegetation experiment.]** Ber. Deut. Bot. Ges. 36: 199–201. 1918.

621. TREVAN, J. W. **The viscosity of blood.** Biochem. Jour. 12: 60–71. *Fig. 1–4.* 1918. —As the title suggests, the author describes and discusses a viscosimeter in which stirring the liquid during the observations is possible.—*S. M. Zeller.*

622. URSPRUNG, A., AND A. GOCKEL. **Ueber Ionisierung der Luft durch Pflanzen. [Ionization of the air by plants.]** Ber. Deut. Bot. Ges. 36: 184–192. 1918.

TAXONOMY OE NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, *Editor*

ALGAE

623. POLLOCK, JAMES B. **Blue-green algae as agents in the deposition of marl in Michigan lakes.** Rept. Michigan Acad. Sci. 20: 247–260. *Pl. 16–17.* 1918.—Marl formation in Michigan lakes is discussed, the agency being various species of Cyanophyceae belonging to the genera *Schizothrix, Lyngbya, Rivularia, Dicothrix, Stigonema, Gloeocapsa, Gloeothece,* and various bacteria. The fossil genus *Girvanella* is shown to be probably one of the genera of Cyanophyceae. [See Bot. Absts. 2, Entry 555.]—*E. A. Bessey.*

FUNGI

624. BEACH, WALTER S. **The Fusarium wilt of china aster.** Rept. Michigan Acad. Sci. 20: 281–308. *Pl. 18–22, fig. 28.* 1918.—A detailed study of the wilt of aster and of its causal organism, which is described under the name *Fusarium conglutinans* Wollenweber var. *callistephi* n. var.—*E. A. Bessey.*—See Bot. Absts. 3, Entry 97.

625. BONAR, LEE. **The rusts of the Douglas Lake region.** Rept. Michigan Acad. Sci. 20: 277–278. 1918.—A list of forty species of rusts collected in the summer of 1917 in the vicinity of Douglas Lake in Cheboygan and Emmet counties, Michigan, and determined by Professor J. C. Arthur.—*E. A. Bessey.*

626. Graves, Arthur Harmount. **Some diseases of trees in greater New York.** Mycologia 11: *Pl. 10.* 1919.

627. Kauffman, C. H. **The Agaricaceae of Michigan.** Michigan Geol. Biol. Survey Pub. 26 (Biol. Ser. 5). *Vol. 1,* xxvii + *924 p. Frontispiece and fig. 1-4.* 1918. [Volume 2, *in press.*]—This work is the result of ten years' study by the author on the mushrooms of Michigan. A general introduction on the structure of agarics, distribution, collecting and preserving, etc., is followed by keys to the genera. The genera and species are then taken up under the following sub-family heads: Cantherelleae, Marasmieae, Lactarieae, Hygrophoreae, and Agariceae. For each genus there is a key to the species. The latter are described in great detail and the distribution is stated as far as known. Under each species is given the reference to the original place of publication and to the illustrations of that species. No synonyms are given. The nomenclature follows the Brussels rules of 1910. New species are described in several genera. 884 species are included in the book, not all of which, however, are at present known in Michigan, inasmuch as the known species of the whole northeastern United States have been included in a number of genera, e.g., *Cortinarius, Pholiota,* etc. The genus *Coprinus* is monographed by L. H. Pennington. The final chapter, on mushroom poisoning, is by Dr. O. E. Fischer. A rather detailed bibliography follows, including monographs on various genera. A large glossary and index complete the book. Volume 2, containing the plates, is in press. These plates are excellent heliotype reproductions of photographs taken for the most part by the author, the illustrations being life-size.—*E. A. Bessey.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

628. Baird, Viola B. **Field notes on Ericaceae of the Tahoe region.** Madroña 1: 66-68. 1918.—Fourteen species of this group are recorded from the Lake Tahoe region of California. —*J. M. Greenman.*

629. Bergman, Herbert F. **Flora of North Dakota.** Bienn. Rept. Soil & Geol. Survey North Dakota 6: 151-372. [Chapter XII.] 1918.—The present "Flora" includes the flowering plants, ferns, and fern-allies. The arrangement of families is essentially that of the late Professor Bessey. Keys lead to the families, genera, and species enumerated, but no descriptions of species are given. A general account of the botanical expeditions, the main geological and physiographical features, as well as the types of vegetation of the state precede the taxonomic part of the work.—*J. M. Greenman.*

630. Craib, William Grant. **Primulae Novitates Nonnullae.** [**Some novelties of Primula.**] Notes Roy. Bot. Gard. Edinburgh 10: 205-210. 1918.—*Primula aequalis* Craib, *P. orestora* Craib & Cooper, and *P. pauciflora* Watt are described from specimens collected in India as species new to science. *P. erythrocarpa* and *P. platycrana* Craib are described as new species from plants grown in the Royal Botanic Garden of Edinburgh from seeds collected in Bhutan, India.—*J. M. Greenman.*

631. Craib, William Grant. **Gesneracearum Novitates Nonnullae.** [**Some novelties of the Gesneraceae.**] Notes Roy. Bot. Gard. Edinburgh 10: 211-219. 1918.—Craib describes the following plants of China as new to science: *Chlamydoboea connata, Perantha minor* gen. et sp. nov., *P. Forrestii, P. cordatula, Petrocosmea Henryi, Tremacron Forrestii* gen. et sp. nov., and *T. Mairei.*—*J. M. Greenman.*

632. Koorders, S. H. **Abbildung und Beschreibung von Rafflesia atjehensis aus Nord-Sumatra.** [**Illustration and description of Rafflesia atjehensis from North Sumatra.**] Bull. Jard. Bot. Buitenzorg III, 1: 77-81. *Pl. 1-3, Fig A-K.* 1918.—The author gives a detailed description of this parasitic species and accompanies the same by an illustration.—*J. M. Greenman.*

633. KOORDERS, S. H. **Notiz über eine neue abbildung von Rafflesia Hasseltii Sur. [Notice of a new illustration of Rafflesia Hasseltii Sur.]** Bull. Jard. Bot. Buitenzorg III, 1: 82–83. *Pl. 4.* 1918.—Further notes are recorded concerning *Rafflesia Hasseltii* Sur., and a hitherto unpublished illustration of this species is presented.—*J. M. Greenman.*

634. KOORDERS, S. H. **Beitrag zur Konntniss der flora von Java No. 9. Beschreibung und abbildung von einer neuen art von Prunus aus West-Java. [Contribution to the knowledge of the flora of Java No. 9. Description and illustration of a new species of Prunus from West Java.]** Bull. Jard. Bot. Buitenzorg III, 1: 84–85. *Pl. 5. Fig. A–L.* 1918.—*Prunus pseudoadenopoda* is described and illustrated as a new species from western Java.—*J. M. Greenman.*

635. KOPS, JAN, F. W. VAN EEDEN, AND L. VUYCK. **Flora Batava. Afbeelding en Beschrijving der Nederlandsche Gewassen. [Flora of Holland. Illustrations and descriptions of the plants of Holland.]** Parts 392^{e}–395^{e}. *Pl. 1961–1976.* Nijhoff: s'Gravenhage. 1918.—The present parts contain illustrations and descriptions of several vascular and non-vascular plants. The vascular plants included are: *Rubus apricus* Wimmer, *Thlaspi perfoliatum* L., *Silene stricta* L., *Oenanthe pimpinelloides* L., *Rubus caesius* L. *forma glandulosus* Focke, and *Polygonum patulum* Bieb.—*J. M. Greenman.*

636. MERRELL, E. D. **Description of a new species of Pollinia in Java.** Bull. Jard. Bot. Buitenzorg. III, 1: 16. 1918.—*Pollinia geminata* is described as a new species from Java.—*J. M. Greenman.*

637. S[MITH], W. W. **Diagnoses specierum novarum in herbario Horti Regii Botanici Edinburgensis cognitarum (Species asiaticae). [Diagnoses of new species found in the herbarium of the Royal Botanic Garden of Edinburgh (Asiatic Species).]** Notes Roy. Bot. Gard. Edinburgh 10: 167–204. July, 1918.—The following new species and varieties are described, and their authorship is attributable to W. W. Smith unless otherwise indicated: *Anaphalis rhododactyla, Asystasia silvicola, Chirita chlamydata, C. Dalzielii, C. umbricola, Chrysanthemum jugorum, C. jugorum* var. *tanacetopsis, Daedalacanthus Wardii, Dicliptera elegans, D. induta, Elsholtzia penduliflora, Eranthemum shweliense, E. tapingense, Helicia annularis, H. clivicola, H. pallidiflora, H. shweliensis, H. silvicola, H. vestita, Hemigraphis fluviatilis* Clarke, *Justicia albovelata, J. microdonta, J. Wardii, Loranthus scoriarum, Lysionotus Forrestii, L. gracilis, L. Wardii, Peristrophe yunnanensis, Phacellaria ferruginea, Phytolacca clavigera, Rhynchanthus Beesianus, Strobilanthes arenicolus, S. Austini* Clarke, *S. claviculatus* Clarke, *S. Cyclus* Clarke, *S. fimbriatus* Nees var. *manusculus, S. Hancockii* Clarke, *S. hupehensis, S. hygrophiloides* Clarke, *S. Lamium* Clarke, *S. mekongensis, S. oresbius, S. pinetorum, S. polyneuros* Clarke, *S. psilostachys* Clarke, *S. rufohirtus* Clarke, *S. scoriarum, S. stramineus, S. Wardii, Tanacetum elegantulum, T. glabriusculum,* and *T. oresbium.*—*J. M. Greenman.*

638. TRELEASE, WILLIAM. **Winter Botany. A companion volume to the author's Plant Materials of Decorative Gardening.** *10 x 14 cm.,* XL × *394 p., numerous text fig.* Published by the author: Urbana, Ill. 1918.—This little volume deals primarily with trees and shrubs in their winter state. A dichotomous key, based largely on position of leaves, character of leaf-scar, nature of pith, etc., leads the reader to the various genera included of which there are 326 belonging to 93 families. The volume is copiously illustrated with text figures.—*J. M. Greenman.*

639. VAN LEEUWEN-REYNVAAN, W. AND J. **Niederländisch Ost-Indische Gallen. No. 10. Einige gallen aus Java, achter beitrag. [Dutch East India Galls No. 10. Some galls from Java, eighth contribution.]** Bull. Jard. Bot. Buitenzorg III, 1: 17–76. *Text fig. 98.* 1918.—While this paper is concerned primarily with plant galls of Java, yet there is recorded a good deal of information concerning the plants of Java, which is of interest to the taxonomist as well as the student of plant geography.—*J. M. Greenman.*

Vol. 2 OCTOBER, 1919 No. 4

ENTRIES 640-893

BOTANICAL ABSTRACTS

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BURTON E. LIVINGSTON, Editor-in-Chief
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Vol. II OCTOBER, 1919. ENTRIES 640-893 No. 4

Note:—The four months, June to September, are omitted. Vol. II ends with no. 6, December.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

640. BERGMAN, H. F. **A report on the plant survey of Barnes county, North Dakota.** Bienn. Rept. Dir. Agric. Coll. Surv. North Dakota (1911–1912) 6: 121–150. 1918.—Work was begun on the survey in 1905 and continued presumably during the summer months until 1911. The country varies from flat to undulating prairie. Woodland is confined to narrow strips along the banks of streams. Marsh lands also occur, but prairie land is the most extensive and characteristic of this country, although grama (*Bouteloua*) is the most abundant grass. *Andropogon* and *Bouteloua* are predominant in the moist valleys while on the uplands *Stipa* and *Bouteloua* are predominant. The true Buffalo grass (*Bulbilis*) forms occasional patches. This publication also contains lists of the more important species and a catalogue of plants. —*H. L. Shantz.*

641. BERGMAN, H. F. **Flora of North Dakota.** Bienn. Rept. Dir. Agric. Coll. Surv. North Dakota (1911–1912) 6: 151–372. 1918.—In the introduction to the flora an account is given of the early exploration, of the later collections and a description of the physiography of the state. The vegetation shows little diversity. Timbered areas are limited largely to stream banks and to the Turtle mountains and consist largely of elm, ash, box-elder, oak and hackberry; the prairie is divided into *Bouteloua-Bulbilis*, or short grass prairie and *Andropogon* prairie. The latter is limited in the east by high soil water content and is replaced in the west on the drier soils by the short grasses. In the southwest yellow pine and juniper occur in the badlands. A discussion is given of the vegetation of alkali lands, wet meadows, river banks and of the weeds of cultivated fields.—*H. L. Shantz.*

642. CANNON, W. A. **The evaluation of the soil temperature factor in root growth.** Plant World 21: 64–67. Mar., 1918.—It is shown that the product formed by the rate of root growth at a given temperature (*R*) and the duration of this temperature (*T*) is a datum of ecological importance in investigating distributional controls. The product *TR* has been determined for *Covillea* for Tucson, Arizona, and Carmel, California, on the basis of growth measurements of roots under controlled conditions, and of detailed inspection of soil thermograph records. The expected root growths under natural conditions at Tucson and Carmel are respectively 74 mm. and 588 mm. This plant is characteristic at Tucson and can not be made to grow at Carmel.—*Forrest Shreve.*

643. COLLINS, MARGORIE ISABEL. **On the leaf anatomy of Scaevola crassifolia, with special reference to the epidermal secretion.** Proc. Linn. Soc. New South Wales, 42: 247–259.

6 fig. 2 pl. Sept., 1918.—A morphological study of the leaf structures of *Scaevola crassifolia*, a xerophytic sand-dune plant of the Goodeniaceae growing near Adelaide. All stages are included in the investigation from the earliest formative structures to the mature leaves. Closely set, peltate, glandular hairs covering the surface of the rudimentary leaves secrete a sticky substance that completely coats over the entire growing point. These glands suspend their activity as the leaf matures and the secretion dries, giving the leaf a lacquered appearance. Where the leaf base attaches to the stem the glands remain active so that the axil of the leaf is filled with the secretion which serves to protect the young bud. At a later stage the leaf becomes succulent and this dried secretion falls off. Stomata are seen in all stages of their development but they are functionless at first owing to the plugging of their pores with the secretion. With the cessation of glandular activity the stomata reach their full development and become functional. Differentiation of leaf tissues is likewise belated, beginning first with the decreased activity of the glands. The mature leaf is thick and succulent due to the development of water storage tissue. No spongy mesophyll is formed, the bulk of the leaf consisting of a number of rows of palisade cells. Mucilage cells and water storage tracheids are derived from this central tissue.—*P. D. Strausbaugh.*

644. Focke, W. O. **Die nordwestdeutsche Küstenflora. [The coastal flora of northwestern Germany.]** Flora 111-112: 282–293. 1918. Discussing the general features of the vegetation, the author states that the bog formation occurs in one station only. Forest is absent, but some herbaceous members of the forest flora occur, possibly favored by the high humidity. A few calciphile species occur on shell-beds, while calciphobes are rare and of recent introduction. The drying effect of the wind is of little importance and most injury by the wind is due to the salt spray which it carries inland. Occasionally all the planted trees in a locality die simultaneously without visible external injury, and this the author believes is due to subterranean salt water. Certain non-halophytic plants limited to the seashore are probably favored by special climatic conditions of humidity and temperature.—*H. A. Gleason.*

645. Folsom, Donald. **The influence of certain environmental conditions, especially water supply, upon form and structure in Ranunculus.** Physiol. Res. 2: 209–276. *24 fig.* Dec., 1918.—The aim of this work in the words of the author is "to determine quantitatively the responses produced in the development of two plastic species (*Ranunculus sceleratus* and *R. abortivus*) with regard to certain differences in the surroundings, especially in soil-moisture content, and to determine as far as possible any correlations that may be manifest between structural differences occurring in various parts of the plant, on the one hand, and the environmental conditions, on the other." [See Bot. Absts. 2, Entry 307.]—*P. D. Strausbaugh.*

646. Gail, Floyd W. **Some experiments with Fucus to determine the factors controlling its vertical distribution.** Publ. Puget Sound Biol. Sta. 2: 139–151. *1 chart, 6 tables.* Dec., 1918.—Light is found to be the controlling factor in determining the lower limit of Fucus. With the reduction of light intensity sporelings can not survive when planted more than 3 dm. below the surface, and well grown plants at a depth of 1 m. undergo decomposition and death. Gravelly beaches are without Fucus because of the movement of the stones, and the smoothness of the latter permits of rapid and thorough drying during low tide thus preventing germination.—*P. D. Strausbaugh.*

647. Griggs, Robert F. **The recovery of vegetation at Kodiak.** Ohio Jour. Sci. 19: 1–57. *32 fig.* Nov., 1918.—The first of a series of papers setting forth the results of the Katmai Expeditions of the National Geographic Society. The eruption of Katmai in 1912 spread an ash blanket a foot in depth over the region of Kodiak a hundred miles distant from the volcano. All herbaceous vegetation was suppressed. Within three years a remarkable recovery of vegetation had taken place largely due to the revived activity of old plant parts buried beneath the ash layer. The ash contains a very small quantity of nutrient salts and possesses no "fertilizing" property as has sometimes been asserted. However it improves the physical condition of the old soil when mixed with it. The ash cover forms a very unstable bed for seedlings and they have no chance except in sheltered places. The ash is being rapidly re-

moved by the agencies of erosion and little will remain with the passing of another century. The bogs of the region were practically all destroyed and salt marsh conditions have been so modified that while a reestablishment of this feature is expected, the number of such marshes will be very much reduced. The alpine heath is beginning to reappear and a study of its reestablishment will result in a better understanding of the life conditions of an arctic alpine flora. Photographs of definitely located sites were found to be more advantageous in establishing vegetation stations than the meter quadrat method of Clements.—*P. D. Strausbaugh.*

648. Osborn, T. G. B. **On the habitat and method of occurrence in South Australia of two genera of lycopods hitherto unrecorded for the state.** Trans. Roy. Soc. South Australia 42: 1–12. *Fig. 3, pl. 1.* 1918.—*Isoëtes Drummondii* and *Phylloglossum Drummondii* are here recorded for the first time from South Australia. The association in which both are found is described in detail; it also includes a considerable number of other geophytes. The author regards it as "a seasonal swamp developed upon alluvial soil within the formation of sclerophyllous woodland." The species of Isoëtes here reported is of peculiar interest in that it is seldom submerged.—*P. D. Strausbaugh.*

649. Rosendahl, C. O., and F. K. Butters. On the occurrence of *Pinus banksiana* in southeastern Minnesota. Plant World 21: 107–113. *Map.* May, 1918.—The distribution of coniferous forests in Minnesota and their component species is briefly described. The numerous stations for *Pinus Strobus* and the two stations for *P. Banksiana,* which all lie outside the coniferous forest, are described and located on a map of forest areas. The latter tree is believed to have had a more extended range, restricted by prairie fires. [Rev. by Toumey in Jour. Forestry 16: 820–821. Nov., 1918.]—*Forrest Shreve.*

650. Wall, A. **On the distribution of Senecio saxifragoides Hook. f., and its relation to Senecio lagopus Raoul.** Trans. New Zealand Inst. 50: 198–206. *Fig. 1, pl. 3.* June, 1918.—The first of these species is found only along Port Hills and the second is found exclusively on Banks Peninsula. Neither species invades the territory of the other while both occupy characteristically similar habitats—precipitous basalt cliffs. *S. saxifragoides* is the more xerophytic of the two and it is suggested that the restricted distribution of these closely related species may be explained by the difference in rainfall, the higher peaks of Banks peninsula having a greater amount of precipitation than Port Hills.—*P. D. Strausbaugh.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

651. Anonymous. **Report of the Connecticut Park Commission for the two fiscal years ended September 30, 1918.** *36 p., 12 pl.* Hartford, 1919.—Since its creation in 1914 the State Park Commission has acquired 3,150 acres in 18 towns. These areas are well scattered through the State and include mountain tops, woodlands, and river, lake, and seashore frontage. The basic policy adopted by the Commission is to conserve for the entire public as much as possible of the natural beauties of the State. Special effort will be made to protect the animal and vegetable life in the areas acquired. The Commission feels that an immediate demonstration of what is meant by a State park in its largest and fullest sense is necessary, and it is urging the appropriation of sufficient funds to make this possible.—*S. T. Dana.*

652. Forsling, C. L. **Chopped soapweed as emergency feed for cattle on southwestern ranges.** U. S. Dept. Agric. Bull. 745. Jan., 1919.—Severe droughts which occur at intervals of from three to ten years have in the past caused severe setbacks to the range cattle industry in the Southwest through the greatly reduced crop of range forage during such periods and through the lack of an economical feed as a substitute. A substitute, which is satisfactory to a large extent at any rate, has been found in soapweed (*Yucca elata*). Stock eat the leaves of the plant when other more palatable vegetation is scarce. The blooms and the growing tip in the center of the upper circle of leaves form an important forage for cattle in

late spring and early summer. Analysis has shown chopped soapweed to be comparable with native grasses and some of the poorer hay crops. The entire stem as well as the leaves can be utilized, and machines have been developed for chopping both stem and leaves into particles small enough to be eaten by cattle. As ensilage it is satisfactory, but the ensilage process is unnecessary where the soapweed is abundant. The chopped trunks or stems, which furnish the bulk of the feed, are palatable and, when fed with the chopped leaves, are readily eaten by stock without any softening process. There is no cumulative ill effect on the digestive tract of cattle fed on soapweed over a long period. Neither is there any harmful purgative effect from the soapweed, except occasional scouring when feeding is continued after the sap begins to rise in the plant. On the contrary, the soapweed tends to keep the digestive tract of the animal in good condition. It is possible that the occasional scouring effect may be overcome by delaying the chopping of the plants into feed until they have been allowed to dry out for several days after the dry leaves are burned. Soapweed is slow-growing, occupies a soil highly subject to wind erosion, and is a protection to stock, so that it is advisable to use the plant only as emergency feed. Only the larger plants should be selected for cutting, the smaller ones being left to protect the soil. Occasional plants tall enough for the blooms to be out of the reach of cattle should be left for seed plant and as a protection for stock. Small soapweed or bear grass (*Yucca glauca*), and sacahuista (*Nolina microcarpa* and *N. erumpens*) are somewhat similar to the soapweed, the small soapweed being found slightly farther north. It is possible that the greatest use of these plants for feed will be as ensilage. [See Bot. Absts. 3, Entry 180.]—*G. A. Pearson.*

653. Hesselmann, Henrik. **Om vara skogsföryngringsatgarders inverkan pa salpeterbildningen i marken och dess betydelse for barraskogens föryngring. [Influence of silvicultural practice on nitrification of the soil and its importance in the reproduction of coniferous forests.]** Skogsvardsfören. Tidsskr. 16: 1–104. 1918.—For several years Hesselman has been studying the pine heaths of northern Sweden where reproduction is especially difficult. Early investigations convinced him that the difficulty could not be attributed to lack of moisture. He therefore turned his attention to chemical conditions in the forest floor. Where reproduction is lacking, its failure is generally attributed to the fact that under certain conditions the organic matter of the forest floor is not converted into available nitrogen. These conclusions are based upon numerous chemical analyses of soils and plants under different forest conditions. Two general classes of forest soils are recognized. In one the transformation of organic matter into available nitrates is complete, while in the other, the process stops with the formation of ammonia. To the latter class belongs the bulk of the Swedish forests, namely, all the coniferous forests bearing heavy growths of moss and lichen. In forests of this type, clear cutting or even thinnings may bring about lively nitrification. The same result may be accomplished by cultivation in which the humus is mixed with mineral soil, even in closed stands. Decaying brush or logs also favor nitrification. If the layer of raw humus is very thick, cutting alone may not suffice to bring about nitrogen formation, although the production of ammonia is increased. Under such conditions, nitrification is hastened by cultivation or burning. Where large openings are made, the increased nitrogen supply together with increased light may favor herbaceous growth to the detriment of forest reproduction.—*G. A. Pearson.*

654. Jolyet, A. **Cabanes à Chauves-souris.** [Shelters for bats.] Rév. Eaux et Forets 1918: 121–126. June, 1918. [Through abst. by S. T. Dana in Jour. Forestry 16: 936–937.] Systematic breeding of bats as insect destroyers for use in the war-damaged timber is proposed. These animals are recommended because they take insects in the adult stage and so do not destroy the parasites. *Vesperugo* is the genus recommended.—*E. N. Munns.*

655. Pearson, R. S., and Puran Singh. **Preparation of turpentine, rosin and gum from Boswellia serrata (Roxb.) gum-oleoresin.** Indian Forest Rec. 6^{6}: 303–345. 1919.—Field and laboratory investigations were conducted over a period of five years (1908–1912), to determine the best method of obtaining crude gum-oleo-resin of *Boswellia serrata*, and also of sep-

arating its chief components, gum, rosin and turpentine. The investigations also determined the number of trees available in Indian government forests for exploitation. Eighteen different species of the genus *Boswellia* (Burseraceae) are known to science, most of which grow in tropical Africa and India. *Boswellia* yields its gum-oleo-resin only from the living bark when the latter is scarified, the resin quickly congealing when exposed to the air. The crude product has long been known and locally used in India as a frankincense and for medicinal purposes, and it is said to be equal in quality as a substitute for the Arabian and African frankincense. This is a medium to large sized, deciduous species, with thin scaly bark, common on the driest and most exposed slopes of hills throughout India, where it often forms pure open forests. The 24 different government forest divisions contain 42,694,016 trees suitable for tapping, an average of 1,777,917 trees to each forest division. Expressed in terms of the American turpentine "crop" (8000 to 10,000 trees), this number would amount to from 4269 to 5336 "crops." Tapping of *Boswellia serrata* consists in blazing or shaving off a 6-inch-wide girdle of living bark to a depth of about half the thickness of the bark, at a height from the ground of from 2 to 2½ feet. The wound is freshened at intervals of from 4 to 6 days by shaving off a very thin layer of bark from the old blaze and also about 1 inch of the new bark on the upper edge of the wound. The hardened gum is scraped from the wound with a dull knife before each retapping operation. The average yield per tree per year is about 2¼ pounds, the annual yield from 8000 to 10,000 trees amounting to from 18,000 to 22,500 pounds. The turpentine is obtained by steam distillation of the mass, the total yield being approximately 7 per cent, or from 157 to 197 gallons, and the remaining yield consists of nearly equal proportions of resin and gum, which are separated by means of solvents. Tapping is begun in November and terminated within 5 or 6 months, and the period during which the trees can be profitably worked is about 5 or 6 years. Investigations showed that continuous tapping for this period is not advisable, but that each year's tapping should be followed by 2 years' rest, fixing the rotation at 3 years. The effect of the tapping on the vitality of the trees is said not to be serious, for all of the wounds become completely healed. Owing, however, to the exceedingly uneven surface of the healed trunks it would seem very difficult, if not entirely impracticable, to again work these trees. Eighty-nine per cent of the turpentine from *Boswellia serrata* is distilled at temperatures of from 153° to 160°C., while 85 per cent of American turpentine distils between 155° and 163°C., and from 85 to 90 per cent of French turpentine passes over between 155° to 165°C. The general statement is made that *Boswellia* turpentine, consisting mainly of dextropinene, is as good as the best American and French turpentines. It dissolves colophony, dammar, sandarac, and soft copal, as readily as do pine turpentines. Varnishes made with it are practically identical with those made with pine turpentines, the important difference being that *Boswellia* varnishes dry more rapidly than others and have a uniformly dull "face," while varnishes made with American turpentine remain bright. As a substitute for the American product *Boswellia* turpentine would be placed between the French or Spanish and the Swedish or Russian oils. *Boswellia* rosin, similar in physical characteristics to pine rosins, can be used for all of the purposes to which pine rosins are put, except for soap making. *Boswellia* gum, in appearance not unlike gum arabic, is likely to be useful mainly for the manufacture of sizing for textiles, etc., but owing to the lack of complete solubility in water due to the presence of resin, it can not be used for these purposes without special treatment.—*Geo. B. Sudworth.*

GENETICS

GEORGE H. SHULL, *Editor*

656. BABCOCK, E. B., AND J. L. COLLINS. **Genetics laboratory manual.** First edition. *15.5 × 24 cm., xi + 56 p., 14 fig.* McGraw-Hill Book Co. Inc.: New York. 1918. Rev. by L. J. COLE in Jour. Hereditary 10: 19–40. Jan., 1919.

657. BARKER, E. EUGENE, AND R. H. COHEN. **Variability in the radish.** Jour. Heredity 9: 357–361, 384. *Fig. 10.* Dec., 1918.—Aim of study was to determine more exactly the

amount of variability in a representative kind of root vegetable, and also what genetic factors most affect yield. Four hundred seeds each, of three varieties, were used, two of which were supposed to be alike at time of maturity. Marked variation was found with respect to vitality of seed, marketable quality of roots and trueness to type, the latter character of which was shown statistically. Authors attribute these undesirable variations to improper seed selection, and particularly to mass selection. Methods for improvement by selection are suggested.—*C. E. Myers.*

658. Castle, W. E. **Is the arrangement of the genes in the chromosome linear?** Proc. Nation. Acad. Sci. U. S. Amer. 5: 25–32. *2 fig., 1 diagram.* Feb., 1919.—On the assumption that the crossover percentages shown by any two pairs of genes are *exactly* proportional to their distances apart, Castle proposes an arrangement in three dimensions instead of the familiar linear series. He believes that this scheme gives more exact agreement of observation and expectation for large crossover values (long "distances"). Certain difficulties with respect to the smallness of the "double crossover" class are mentioned, and a subsidiary hypothesis to account for them is proposed.—*A. H. Sturtevant.*

659. Castle, W. E. **The linkage system of eight sex-linked characters of Drosophila virilis (data of Metz).** Proc. Nation. Acad. Sci. U. S. Amer. 5: 32–36. *Fig. 3–4.* Feb., 1919.—This applies to *D. virilis*, author's three dimensional arrangement of linked genes. [See preceding abstract.] Several predictions are made, as to the crossover values to be expected from certain untried combinations. For instance, glazed-rugose is put at 4 or 5 per cent or probably a little greater.—*A. H. Sturtevant.*

660. Classen, K. **Vererbung von Krankheiten und Krankheitsanlagen durch mehrere Generationen. [Heredity of diseases and of disease tendencies during several generations.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 31-36. 1918.

661. Cockerell, T. D. A. **The varieties of Helianthus tuberosus.** Amer. Nat. 53: 188-192. *2 fig.* Mar.-Apr., 1919.—The Jerusalem artichoke has been in cultivation more than three hundred years. It is a native of North America, and was used as food by Indians in pre-Columbian times. Has secured little attention from breeders, is enormously prolific, and tubers are excellent food for man and beast. Recent experiments indicate that it may be an important source of sugar, in the form of syrup. Tops can be used as fodder. For these reasons, author believes it to be desirable to investigate the existing varieties and record principal characteristics.—He describes seven named varieties which differ widely in a number of characteristics. Cultivated forms produce larger tubers than the wild forms; and some varieties yield twelve pounds to a plant. Suggests possibility of crossing to improve type and size. Distribution of anthocyanin is variable in the different varieties.—*C. E. Myers.*

662. Cockerell, T. D. A. **Hybrid perennial sunflowers.** Bot. Gaz. 67: 264–266. Mar., 1919.

663. Cole, Leon J., and William A. Lippincott. **The relation of plumage to ovarian condition in a Barred Plymouth Rock pullet.** Biol. Bull. 36: 167–182. *2 pl.* Mar., 1919.—Description of changes in plumage in a hen, associated with development of an ovarian tumor. The change was made from the female plumage to that of a male. Following implantation of normal ovary, there was a reversal of plumage development. Special attention is called to width of bars as a secondary sexual character *not* affected by ovarian secretions.—*H. D. Goodale.*

664. Collins, J. L. **Chimeras in corn hybrids.** Jour. Heredity 10: 3–10. *6 fig.* Jan., 1919.

665. Cook, O. F. **Evolution through normal diversity.** Jour. Washington Acad. Sci. 9: 192–197. Apr. 4, 1919.

666. Danforth, C. H. **The developmental relations of brachydactyly in the domestic fowl.** Amer. Jour. Anat. 25: 97–116. *5 fig.* Mar. 15, 1919.—See Bot. Absts. 3, Entry 31.

667. Davenport, Charles Benedict, assisted by Mary Theresa Scudder. **Naval officers, their heredity and development.** Carnegie Inst. Washington Publ. 259. *236 p.* 1919.—See Bot. Absts. 3, Entry 246.

668. Edwards, F. W. **Some parthenogenetic Chironomidae.** Ann. Mag. Nat. Hist. 3: 222–228. Feb., 1919.—Females emerging from isolated pupae of *Chironomus clavaticrus* and *Corynoneura innupta* (a new species) deposited eggs which developed parthenogenetically. Offspring were females in all cases. Males are unknown in both species. Author finds only two other recorded cases of parthenogenesis in Chironomidae, in *Tanytarsus boiemicus* and *Corynoneura celeripes*, and in each case offspring were females. Speculates briefly on origin of parthenogenesis.—*A. Franklin Shull.*

669. Elmiger, J. **Über schizophrene Heredität. [On heredity of schizophreny.]** Psych.-neurol. Wochenschr. 19: 31–34. 1917–1918. [Through abst. by Kurt Mendel in Neurol. Centralbl. 1918: 760. Nov., 1918.]—Summary asserts (1) that "indirect" heredity of schizophreny plays four times as important a rôle as "direct" heredity; (2) that indirect heredity can be proved in 8 per cent of the non-schizophrenous psychoses; (3) that direct tainting with structural abnormalities and mania for drinking occurs about equally in schizophrenous psychoses; (4) that marriages in which one party is schizophrenous average fewer children than normal marriages; (5) that marriages with both parties schizophrenous are rarities; (6) that average proportion of healthy to sick sibs was 2.5 to 1; (7) that schizophreny is transmitted as a recessive.—*J. P. Kelly.*

670. Gates, William H. **Another hen that crowed.** Jour. Heredity 9: 343–347. *6 fig.* Dec., 1918.—An interesting instance of a hen that assumed complete male characters, associated with cystic degeneration of the ovaries. History of the bird is of particular importance, because she not only assumed plumage, spurs and head gear of male, but also assumed his habits: crowing, giving the characteristic male call for food, and treading hens. In habit, then, she differed from hens from which the ovary has been removed, since such birds lack these reactions, though normal hens occasionally exhibit them.—*H. D. Goodale.*

671. Gregor, Adalbert. **Rassenhygiene und Jugendfürsorge. [Race hygiene and the care of youth.]** Arch. Rassen- u. Gesellschafts-biol. 13: 37–55. 1918.

672. Gutherz, S. **Zur Lehre vom Ursprung der tierischen Keimzellen. [To the doctrine of the origin of the animal germcells.]** Arch. Mikrosk. Anat. 92[2]: 1–40. *2 pl., 1 fig.* 1918.

673. Halsted, Byron D. **Possible correlations concerning position of seeds in the pod.** Bot. Gaz. 67: 243–250. Mar., 1919.

674. Harris, F. S. **The sugar-beet in America.** *13 × 19 cm., v + 342 p., 31 pl., 38 fig.* Macmillan Co.: New York. Jan., 1919.—Chapter 5 (p. 213–230) discusses production of sugar-beet seed, dealing chiefly with cultural and commercial problems, but pointing out evidences of great hereditary diversity in beet populations, and importance of developing distinctive strains especially suited to American conditions. Attempt to produce variety with single-germ seed (as carried on by U. S. Department of Agriculture) made some progress, but results were not altogether satisfactory and this work was abandoned. Single-germ seed is desirable, but may not be possible of attainment. Discussion of improvement by selection is very brief and contains nothing new.—*G. H. Shull.*

675. Heal, John. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 25–26. *Fig. 9.* Jan. 18, 1919.—Popular account of author's experiments in hybridization. List is given of large number of interspecific hybrids. In case of *Begonia* these are divided up into those which resemble female and those which resemble both parents. [See Bot. Absts. 2, Entry 713.]—*M. J. Dorsey.*

676. HEGNER, R. W. **Variation and heredity during the vegetative reproduction of Arcella dentata.** Proc. National Acad. Sci. U. S. Amer. 4: 283–288. Sept., 1918.—By study of progeny of 171 "wild" specimens it was found that (a) variations in spine number occurred among descendants of single specimens during fission and were in part inherited, (b) "wild" population consists of large number of heritably diverse families so far as spine number is concerned. —Author next attempted to isolate heritably diverse lines from among descendants of a single specimen, produced by vegetative reproduction. During 39 days before selection was begun among descendants of individual chosen as parent, 7 generations totaling 198 specimens were obtained with mean spine number of 10.87. Then selection was carried on for 64 days during which 22 generations totaling 1192 specimens were reared. During 6 successive portions of this 64-day selection period differences between mean spine numbers of high and low line were: —0.07, 0.50, 0.40, 0.48, and 1.16. Mean difference was 0.55.—Now followed 35 days of no selection during which 18 generations totaling 1325 specimens were reared. Differences for 4 successive portions of this no-selection period were 0.94, 0.07, 0.41, 0.43 and mean difference was 0.46.—Then he attempted to break low line into high and low portions. During 23 days of selection average difference in mean spine number of two divisions of ex-low line was 0.30. During a succeeding non-selection period of 11 days this average difference was 0.44. Thus two lines heritably diverse in spine number were isolated among the descendants of this low line. Similar results were obtained with respect to diameters. At least 2 apparent "mutations" occurred in low line. Small individual having 8 spines and 27 units diameter appeared in this line, but its progeny of 4th generation had regained diameter and spine number of low line. Progeny of other apparent "mutation" had mean spine number of 9.91, mean diameter of 23.51 units; mean spine number of its parent low line was 10.99, mean diameter 27.05 units, giving difference in mean spine number 1.08, and in mean diameter 3.54 units. These differences persisted; therefore this specimen was a sudden large variation that was inherited, i.e., a "mutation." Descendants of this mutant were most variable set studied.—Hence among numerous progeny of single specimen of *Arcella dentata*, produced by vegetative reproduction, are many heritably diverse branches due to slight variations and sudden large variations ('mutations'). This appears a true case of evolution observed in laboratory and occurring similarly in nature.—*A. R. Middleton.*

677. HERTWIG, OSKAR. **Das Werden der Organismen. Zur Widerlegung von Darwin's Zufallstheorie durch das Gesetz in der Entwicklung. [The origin of organisms. Refutation of Darwin's theory of chance, through law in evolution.]** 2nd enlarged and improved ed. *8 vo., xviii + 680 p., 115 fig.* 1918. [From Publisher's announcement in Zoöl. Jahrb. 41: cover page 3. 1918.]—Author considers older theories of reproduction, position of biology as regards vitalistic and mechanistic conceptions of life, theory of the "specific cell" (Artzelle") as basis for origin of living creatures and genesis of many-celled organisms from "specific cells;" biogenetic law; maintenance of life processes through successive generations; classification; question of constancy of species; position of organisms in mechanism of nature; present standpoint of heredity; history of theories of descent; Lamarckism and Darwinism; critique of theory of chance, and selection.—*J. P. Kelly.*

678. IBSEN, HEMAN L. **Synthetic pink-eyed self white guinea-pigs.** Amer. Nat. 53: 120–130. *5 fig.* Mar.–Apr., 1919.

679. IKENO, S. **Zikken-Idengaku.** [A text-book on genetics] (Japanese). 3rd ed., rewritten and augmented. *22 × 14.5 cm., 230 p., 8 pl. 38 fig.* Nippon-no-Rômazi-Sya: Tôkyô, 1918. Price, 2 yen 80 sen [$1.40].—Third edition of an elementary text-book on genetics, first published in 1913 and written in Romanized Japanese. It consists of short introduction, and three parts: Hybridization, Variation, and an Appendix; illustrative examples are mainly taken from Japanese investigations. In Part I (p. 5–110), after description of various kinds of hybrids, methods of investigation, and history of hybridization experiments since Kölreuter, comes discussion of monohybrids, back-crossing and use of mean error for testing goodness of fit of Mendelian results being explained on them. Then follows description of

di-, tri- and polyhybrids. Presence and absence hypothesis is discussed in one whole, though short, chapter. Appearance of new characters by hybridization, epistasy and hypostasy, polymery, linkage, xenia, and non-Mendelian hybrids, etc. form subjects of another chapter. Still another chapter contains results of hybridization experiments with rice pursued by Dr. Katô. The hereditary behavior of some characters of this plant, which has remained undescribed till now, at least in any European language, is noticed below, each pair of characters mentioned being allelomorphic, the first one of each pair being dominant: awn (or apical part of palea, if awn is absent) red vs. colorless; palea brown vs. colorless; palea colorless vs. yellow; stigma purple vs. colorless; grains red vs. white; ripe grains not readily falling from axis vs. falling off very easily (as, for instance, by light wind); susceptibility to disease caused by *Leptosphaeria Cattanei* vs. immunity from it; all these characters segregate in F_2 in typical 3 : 1 ratio. Some quantitative characters were also studied: thus, in the hybridizations, high × low stature, long × short panicle, thick × thin stem, the first-named characters being always perfectly or almost perfectly dominant towards the second; while in compact × loose arrangement of grains and broad × narrow leaf, the F_1 hybrid lies intermediate between the two parents; in respect to time of the appearance of first panicle, as well as amount of tillering, the F_1 hybrid belongs to second class given above. Mode of segregation of all these quantitative characters is very complex, owing without doubt to presence of multiple factors, and has not been completely studied. In next chapter, which is concerned with heredity of mankind, normal characters, as eye-color, skin-color, shape and color of hairs, etc., as well as teratological ones, as brachydactyly, etc., and diseases, are discussed.—Part II (p. 111–170), devoted to variations, is divided into two chapters. In that relating to non-heritable variations, fluctuations come first, their general laws, causes, variation-curves and biometrical constants being explained. Pure line theory of Johannsen is explained by means of illustrative instances, both from plants and animals. Modification due to external influences is also described, and non-inheritability of acquired characters is discussed. In chapter relating to heritable variations, mutations, bud-variations, famous experiments of de Vries on Oenothera, and variations by combinations come in order.—The appendix (p. 173–220) contains Japanese translation of Mendel's paper on peas.—*S. Ikeno.*

680. IKENO, S. **On hybridization of some species of Salix.** Jour. Genetics 8: 33–58. *1 pl. 1 fig.* Dec., 1918.—Reference is made to Wichura's *Salix* hybrids breeding true in generations beyond F_1. Experiments conducted with few species show this is not always the case with respect to certain characters. Growth habit of stem, pubescence of leaves, color of stigma, all show segregation in F_2 but no definite Mendelian ratios were obtained. Stipulation of leaves is variable on F_1 plants, some leaves with stipules, others without on the same plant, or even the two halves of the same stem may differ in this respect. Segregation of this character in F_2 is not proved. *Salix purpurea multinervis* × *S. gracilistyla* gave two types of individuals with catkins resembling one or the other parent. When like F_1 types of each of the two kinds were crossed together many of the same type of catkin and few of the opposite type were produced. When different types were mated approximate equality of the different types were secured in the offspring. In two of these matings a new type of catkin appeared. Both parents bred true for catkin type in one generation tested, 70 and 100 individuals having been grown. Several hypotheses are considered. Of these the most probable assures one or both of parents heterozygous for indivisible factors not affecting the catkin type in the parental combination in which they occur. Thus the appearance of the two types of catkins in F_1 is not due to segregation of the main catkin factors themselves and all individuals in F_1 agree in carrying these in heterozygous condition. Their segregation was found to take place in F_2, the peculiar method of this segregation is explained on the basis of the subsidiary factors. The same cross repeated one year later between the same female individual and either the same individual male or from the same clonal line gave a different result in that no twin hybrids were produced but all the progeny (nearly 50 individuals) were of purely maternal type and all of the same sex. Literature on "false hybrids" (pseudogamy, merogony) is reviewed. Table of successful and unsuccessful hybridizations of various species of *Salix* is appended.—*D. F. Jones.*

681. Key, Wilhelmine E. **Better American families.** Jour. Heredity 10: 11–13. Jan., 1919.

682. Kezer, Alvin, and Breeze, Boyack. **Mendelian inheritance in wheat and barley crosses, with probable error studies on class frequencies.** Colorado Agric. Exp. Sta. Bull. 249. *139 p., 9 pl., 10 fig.* Oct., 1918.—Red and white chaff and beardlessness and beardedness were studied in wheat and gave the usual monohybrid ratios; when two characters were studied together the dihybrid ratio was obtained. Wheat crossed with emmer showed F_1 intermediate. In F_2 pubescence and black glume always occurred together. Hooded and beardless barleys gave 3 hooded:1 bearded. White six-rowed × black two-rowed gave 9:3:3:1 with black and two-rowed dominant. Black two-rowed, bearded, crossed with white six-rowed, hooded, gave the usual ratio obtained with three factors. Cross between California six-rowed and Hanna two-rowed, gave F_1 with six rows of kernels and two rows of beards. This is an exceptional case and is peculiar to this cross. Tables showing behavior of F_2 and F_3 with probable errors are given. Many colored illustrations are given. Tables giving expected class frequencies for mono-, di- and trihybrid ratios for numbers up to 500 are given. Tables for the probable errors for mono-, di- and trihybrid ratios are given in numbers for populations up to 500.—*H. H. Love.*

683. Legrand, L. **The collocation of plasmas within the cell. II.** Sci. Amer. Suppl. 85: 60–64, 76, 77, *24 fig.* 1918.—Diagrams illustrate conception of distribution of plasmas in fertilized egg, in form of concentric regions overlapping one another in various patterns and thus presenting wide range of variation in interrelated surface contacts. According as arrangements vary so do regions become active in different degrees or even remain latent. Similarly plasmas in paternal and maternal chromosomes by sliding and twisting movements of chromosomes become associated in different ways and to different degrees or even may be prevented from coming into contact.—*B. M. Davis.*

684. Lenz, Fritz. **Über dominant-geschlechtsbegrenzte Vererbung und die Erblichkeit der Basedowdiathese. [Dominant sex-linked heredity and the inheritance of the Basedow diathesis.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 1–9. *5 fig.* 1918.

685. Little, C. C. **A note on the fate of individuals homozygous for certain color factors in mice.** Amer. Nat. 53: 185–187. Mar.–Apr., 1919.

686. McArthur, Clifford L. **Transmissibility of immunity from mother to offspring in hog cholera.** Jour. Infect. Dis. 24: 45–50. Jan., 1919.—Investigators have previously noted that immune mothers produce pigs possessing some immunity to hog cholera. However most of sows used had passed through an outbreak of the disease and had not been subjected to the Dorset-Niles method. Author's experiments were carried on with sows rendered immune by Dorset-Niles anti-hog cholera serum with virus. Results of six sets of experiments indicate that pigs of sows immunized against hog cholera by Dorset-Niles method secured and retained immunity as long as they were sucklings, unless sow lost her immunity. In most cases it appeared that immunity of pigs lasted a few weeks after weaning. Second litters appeared, for most part, to be more highly immune while sucklings than first litter. Although exact method of transmission of antibodies is not known, indications are that they are transmitted through the milk.—*R. K. Nabours.*

687. MacCaughey, Vaughan. **Race mixture in Hawaii.** Jour. Heredity 10: 41–47. Jan., 1919.

688. MacDougal, D. T. **Culture of a potato hybrid, Solanum Fendleri × S. tuberosum ("Salinas").** Carnegie Inst. Washington Year Book 17: 87–88. 1918.

689. McRostie, G. P. **Inheritance of anthracnose resistance as indicated by a cross between a resistant and a susceptible bean.** Phytopathology 9: 141–148. Mar., 1919.—Object was to study inheritance of resistant factors of bean anthracnose, and also to secure a com-

mercial type of white bean resistant to the disease.—Wells' Red Kidney, a bush bean, resistant to both strains of *C. Lindemuthianum* was used as one parent. The other parent was a selection of Michigan Robust, a white bean, resistant to one strain of the anthracnose, but very susceptible to the other. Reciprocal crosses were made. The F_1 were vigorous-growing pole-bean types, heavily podded. Seeds were intermediate in size and shape, dark navy blue to black. The F_2 showed a great variety of types, but the 3:1 ratio was observed in color and habit of growth.—Seedlings of the F_2 plants were inoculated artificially. Ten days later resistant ones were transplanted to the field. Different families varied in resistance and many showed close approximation to the 3 : 1 ratio, with resistant character dominant. Similar results were observed in the F_3. Author notes that "the ratios obtained throughout between resistant and susceptible plants indicate quite clearly a single factor difference between resistance and susceptibility to the one strain of anthracnose concerned in the cross. The fact that resistance is dominant makes it more difficult to secure resistant types from the F_2 segregations, as it is necessary to grow all resistant F_2 plants through to the F_3 generation in order to tell whether they are homozygous or heterozygous for resistance."—*C. E. Myers.*

690. MEVES, FRIEDRICH. **Die Plastosomentheorie der Vererbung. Eine Antwort auf verschiedene Einwände. [The plastosome theory of heredity. An answer to various criticisms.]** Arch. Mikrosk. Anat. 92: 41–136. *18 fig.* 1918.

691. MIYAZAWA, B. **Studies of inheritance in the Japanese Convolvulus.** Jour. Genetics 8: 59–82. *Pl. 2, 1 fig.* Dec., 1918.

692. NABOURS, ROBERT K. **Parthenogenesis and crossing-over in the grouse locust Apotettix.** Amer. Nat. 53: 131–142. Mar.–Apr., 1919.—Females of *Apotettix* when kept in isolation, or when placed with males of another genus with which, apparently, they are unable to copulate, may produce offspring parthenogenetically. Crosses involving color patterns indicate that even when female mates some of her offspring may be parthenogenetically produced. Of the parthenogenetically produced offspring, 4470 have been females, 7 males. Diploid (oögonial) number of chromosomes appears to be 14, while in female produced parthenogenetically 9 whole chromosomes and some fragments were found in one somatic cell. Author suggests that egg develops parthenogenetically, or not at all, when sperm enters late.

Segregation occurs in eggs that develop without fertilization, as in other eggs. Crossing-over is demonstrated in eggs that develop parthenogenetically, as in other eggs, in amounts ranging from zero to 12 per cent. The occurrence of *AA* forms as result of cross-over may in part explain greater abundance of these forms in nature.—*A. Franklin Shull.*

693. NEWMAN, C. C., AND L. A. LEONIAN. **Irish potato breeding.** South Carolina Agric. Exp. Sta. Bull. 195. *28 p., 19 fig.* June, 1918.—In South Carolina the Lookout Mountain potato (*Solannm tuberosum*) produces abundance of seed balls every year. The writers are attempting to secure potato that can be propagated by seed instead of by tuber cuttings. Data are presented showing that in plants producing seed there is no reduction in yield of tubers. Report covers first season's results with 5000 seedlings of Lookout Mountain. Seedlings were started in greenhouse, set in field in April, and harvested as tops died. The plants varied in size and habit of growth; some seedlings had 3 or 4 cotyledons. Yield of tubers and date of maturity were made basis of classification. Tubers varied in color from white to brown and to pink. On some plants both white and pink tubers occurred. Only 1900 plants produced an ounce or more of tubers, and only 64 yielded a pound or more, these few comparing favorably with yields of individual plants grown from tuber cuttings.—*John W. Bushnell.*

694. NORTON, J. B. **Washington asparagus: information and suggestions for growers of new pedigreed rust-resistant strains.** United States Dept. Agric. Circ. 7. *8 p.* Feb., 1919.—See Bot. Absts. 3, Entry 655.

695. OLSON, P. J., C. P. BULL, AND H. K. HAYES. **Ear-type selection and yield in corn.** Minnesota Sta. Bull. 174: 1–60. *9 fig.* 1918.—See Bot. Absts. 3, Entry 277.

696. Pearl, Raymond. **On the mean age at death of centenarians.** Proc. Nation. Acad. Sci. U. S. Amer. 5: 83–86. *1 fig.* Mar., 1919.

697. Pearson, K., and A. W. Young. **On the product-moments of various orders of the normal correlation surface of two variates.** Biometrika 12: 86–92. Nov., 1918.—Mathematical theory of the normality of correlation. Illustrations are provided.—*J. A. Harris.*

698. Punnett, R. C., and the late Major P. G. Bailey. **Genetic studies in rabbits. I. On the inheritance of weight.** Jour. Genetics 8: 1–25. *12 fig.* Dec., 1918.—A preliminary study of growth and its heredity in rabbits. Crosses were made between the large Flemish Giant and smaller breeds. The average weight in F_1 was intermediate. In F_2, there was a shifting of the average toward that of the smaller breed. Variation was great in both generations. The authors consider the chief point of interest, in this phase of the experiment, to be the failure of the large form to reappear in F_2 in certain of the crosses.—The character of the growth curve is discussed at some length. While there seems to be some tendency for large breeds to mature late, a study of the crossbreds shows that a given final weight may be associated with almost any age of maturity within the limits found in the investigation.—*Sewall Wright.*

699. Punnett, R. C. **Note on the origin of a mutation in the sweet pea.** Jour. Genetics 8: 27–31. *1 fig.* Dec., 1918.

700. Ritchie-Scott, A. **The correlation coefficient of a polychoric table.** Biometrika 12: 93–133. Nov., 1918.—A considerable number of methods are now available for determining the coefficient of correlation between two characters from a table of frequencies. Each of these has its own special appropriate field of usefulness, and the one to be selected will depend upon nature of measurements or observations, or of distribution of frequencies, under consideration. This paper deals with the mathematical theory of the calculation of correlation in cases in which each of the two characters is distributed into three groups.—*J. A. Harris.*

701. Roberts, Herbert F. **An early paper on maize crosses.** Amer. Nat. 53: 97–108. *2 fig.* Mar.-Apr., 1919.—Author expresses belief that work of McCluer (McCluer, George W. Corn crossing. Illinois Agric. Exp. Sta. Bull. 21, 1892) has not been adequately appreciated by later investigators and maintains that McCluer shows inherent instincts of a geneticist although this paper far antedated the days of pure lines, Mendelism and factorial analysis. Attention is called especially to such important observations of McCluer as superiority of F_1 hybrids in point of yield, vigor and uniformity, when compared with their parents; inferiority in yield of F_2 segregates as compared with the F_1; inferiority in size, vigor and yield of plants, as well as increased number of barren plants, abortive tassels, and poorly filled ears, on plots planted with self-fertilized seed as compared with plots planted with crossed seed or seed from open fertilized plants; general observations on the inheritance of purple aleurone, yellow endosperm, and starchy and sugary endosperm, together with recommendations for breeding of corn by farmers.—*C. B. Hutchison.*

702. Robertson, T. Brailsford, and L. A. Ray. **Experimental studies on growth. X. The late growth and senescence of the normal white mouse and the progressive alteration of the normal growth curve due to inbreeding.** Jour. Biol. Chem. 37: 377–426. *8 fig.* Mar., 1919.

703. Salisbury, E. J. **Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.** Ann. Bot. 33: 47–79. *20 fig.* Jan., 1919.—A record of observation on structure of indefinite flowers. In 360 flowers of *Eranthis hyemalis* number of perianth parts ranged from 5 to 9, with majority having 6; increase in number over 6 interpreted as usually due to fission of perianth primordia and not to transformation of nectaries or stamens. In 300 flowers number of nectaries varied from 4 to 12 with mode at 6; increase up to 12 thought due to bifurcations among

six nectaries usually present. Androecium in 300 flowers gave multimodal curve with 18 as lowest number of stamens, 30 as most frequent number, and with high modes at 24 and 27. Curve for gynaecium shows minimum number to be 3 carpels with 6 as most common condition. In general, *Eranthis hyemalis* exhibits trimerous tendency. Increase of one type of organ does not take place at expense of another kind. Correlation tables show that stamens and nectaries or stamens and carpels, or nectaries and perianth parts tend to vary at same time and in same direction. There occurred transitional conditions between involucral bracts and perianth segments; bright-colored bracts are rare but bract-like perianth parts are more common; since reversionary variations are more frequent than progressive ones, author thinks perianth in *Eranthis* has evolved from bracts; moreover in no case was perianth part replaced by nectary. In *Ficaria verna* androecium and gynaecium show marked multimodal seriations with maxima chiefly at multiples of three. Four hundred of 514 flowers had 3 sepals. Tables reveal a correlation (positive) in *Ficaria* between number of stamens and carpels, and between petals and stamens; and augmented corolla must not be attributed to staminal transformation. Data few for *Anemone nemorosa* but here also was a tendency to give maxima at multiple of three and positive correlation between stamens and perianth parts. Author believes early Ranunculaceous type was flower of alternating trimerous whorls with pentamerous condition derivative. [See Bot. Absts. 2, Entry 749.]—*J. P. Kelly.*

704. SCHALLMAYER, W. **Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst. [Heredity and selection. Fundamentals of social biology and science of race improvement.]** 3rd ed. *8vo, xvi + 536 p.* Gustav Fischer: Jena, 1918. [Through Publisher's announcement in Zoöl. Jahrb. **41**: cover p. 2. 1918.]—In part 1 author takes up scientific basis of race improvement starting with discussion of theory of evolution and present teachings on heredity and variation, especially with reference to man; necessity for application of principles to race improvement; decline and extinction of peoples and problem of degeneration, observations on oldest existent civilized nation and sociological problem of aim and evaluation of state policy. Part 2 treats of aims and methods of race increase and of general eugenics. By fundamental revision, and condensation of matter of previous editions, and addition of new material, this third edition becomes almost a new book.—*J. P. Kelly.*

705. SCHULTZ, WALTHER. **Versteckte Erbfaktoren der Albinos für Färbung beim Russenkaninchen im Soma dargestellt und rein somatisch zur Wirkung gebracht. [Hereditary color factors hidden in albino Russian hares, demonstrated in the soma, and purely somatically activated.]** Zeitschr. Indukt. Abstamm. Vererb. **20**: 27–40. *9 fig.* Sept., 1918.

706. SHAMEL, A. D. **Bud variation in dahlias.** Jour. Heredity **9**: 362–364. *Fig. 11–12.* Dec., 1918.—More than three thousand varieties are known to florists. Author believes many of these originated as bud variations. Variations of this kind were recognized as early as 1832. Author describes and illustrates a plant which bears three kinds of flowers, pure white, purple, and mixed white and purple. In some of the mixed flowers some of the petals are almost exactly half white and half purple. Plant has shown similar variability for five years. —*C. E. Myers.*

707. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. **Citrus fruit improvement: A study of bud variation in the Washington navel orange.** United States Dept. Agric. Bull. 623. *146 p. 19 pl., 16 fig.* 1918.—Detailed study of bud variation in the Washington Navel orange, (*Citrus sinensis* L) Osbeck. Authors have recognized many distinct strains which they have succeeded in isolating through bud selection. Fourteen of these strains have been named and described. These differ widely, not only in character of fruit, but also in type of foliage and habit of growth. Only 5 of the 14 are of possible commercial value, the others being detrimental from the orchardist's standpoint.—In addition to these 14 strains, numerous minor variations including chimeras have been found, and in a census of the bearing orchards of California, the lowest percentage of off-type trees was found to be 10, while the highest was 75 per cent. In younger orchards an even higher percentage of diverse types is

found, indicating that prevailing methods of propagation are resulting in rapid deterioration of the variety. To obviate this, authors recommend propagation only of trees which have proved valuable in performance-record tests and they urge further the use of fruit-bearing bud wood with representative fruits attached.—Individual performance records are given of 64 trees extending over a period of four years. These records show conclusively that off-type fruits are produced by certain trees. [See two following Entries, 708, 709.]—*J. H. Kempton.*

708. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: A study of bud variation in the Valencia orange.** United States Dept. Agric. Bull. 624. *120 p. 14 pl., 9 fig.* 1918.—Twelve distinct strains of the Valencia variety (*Citrus aurantium sinensis* L) have been isolated by bud selection. Six of these twelve variations have been closely paralleled in the author's investigations of the Washington Navel variety. Individual performance records for 105 trees extending over a period of four years are given. These records show that off-type fruits are produced by the same trees year after year.—As in the Navel orange, most variations are commercially undesirable and their elimination can be accomplished by proper selection of fruit-bearing bud wood from trees with a high performance record. [See preceding and following Entries, 707, 709.]—*J. H. Kempton.*

709. Shamel, A. D., L. B. Scott, and C. S. Pomeroy. **Citrus fruit improvement: a study of bud variation in the Marsh grapefruit.** U. S. Dept. Agric. Bull. 697. *112 p. 2 pl. 14 fig.* 1918.—Study of bud variation in Marsh grapefruit (*Citrus grandis* Osbeck) shows that variability occurs in this species with about same degree of frequency as has been noted in Washington Navel Orange and other varieties of *Citrus*. [See two preceding Entries, 707, 708.] In census of one of the most valuable groves near Riverside, California, it was found that about 25 per cent of the trees produced fruits having from 30–90 seeds each, the commercial standard for seedless fruits being not more than 12. High correlation has been found between this "seedy fruit" and trees with drooping habit of growth. This correlation permits identification of such trees wherever they occur and once recognized they can be rebudded to desirable seedless type. No trees have been found thus far in which all fruits of a tree were completely seedless though individual limbs bearing seedless fruits have been found.—Six major strains are named and described. Among these is one having bell-shaped fruit which is associated with late ripening, another with rough fruit correlated with globular shape, and third with corrugated fruit having pyriform shape with deeply creased rind, inferior flavor and little juice. Performance record tests reveal fact that certain trees bear only every alternate year while others are always unproductive.—Minor fruit variations have appeared but occur less frequently than in other *Citrus* varieties studied. Among these variations are fruits which resemble oranges externally. Some of these orange-like fruits resemble oranges, tangerines and grapefruits in flesh and juice characteristics. Other fruit variations have been observed such as raised or sunken sections or both, navel fruits, and chimeras, showing parts typical of two or more strains.—Authors have found also that fruits formed at other than normal blooming period often have pyriform or irregular shapes. These fruits usually have very thick rinds, coarse and bitter rag, and lack the distinctive grapefruit flavor of normal fruits borne by same trees. No explanation was found for the appearance of these characteristics in fruits produced out of season. The production of "off bloom" fruits appears, however, to be an individual characteristic. Authors state that there are well defined correlations between characters of fruit, foliage and flowers which, when fully worked out, will be of great importance in eliminating unproductive trees and in selecting trees for propagation. Variations all of which are commercially undesirable can be eliminated by selecting bud wood from tested trees.—*J. H. Kempton.*

710. Silver, Allen. **Finch hybrids.** Avic. Mag. 10: 98. Mar., 1919.

711. Smith, L. H. **Outline of a plan for corn breeding.** Illinois Agric. Exp. Sta. Circ. 221. *4 p.* 1918.—Concise presentation, with certain details left to individual worker, of two plans of breeding. Method A, *mass selection*, is recommended for the busy farmer; method

B, *pedigree selection*, for the breeder who can give the requisite time and careful attention demanded. First two sections of outline are common to both methods; the two plans differ in subsequent breeding operations.—(1) Foundation stock. Suggestions are made regarding choice of variety and selection and preparation of material for testing.—(2) The preliminary ear-row test. Instructions are given regarding the planting of the ear-row test in single or, preferably, in duplicate series. Ear-remnants are saved for future use.—(3) Subsequent breeding. From this point the breeding work may follow either one of two systems.

Method A, *mass selection*. The seed-remnants of the most productive ears, as determined by ear-row test, are to be mixed and planted in an isolated seed plot. From this plot seed is to be selected—with due reference to certain field considerations—and mixed for subsequent planting. This mass selection in the field is to be repeated annually for subsequent planting with, or without, the special seed plot.—Method B, *pedigree selection*. The distinct feature of this method is that the ear-row test is to be repeated another year with same material and that continuous selection and ear-row testing is included. It is recommended that ear-remnants of best ears, as determined by preliminary test, be carried over into more extensive ear-row test the second season. Alternate rows or portions of rows and checks are to be detasseled and seed is to be saved only from detasseled plants of best rows. This procedure is to be repeated in subsequent years. A multiplying plot from extra seed produced in the selected rows is provided for and commercial seed is to be selected from this plot.—*E. C. Ewing.*

712. Stern, Erich. **Psychologische Bemerkungen zur Vererbungs- und Familienstatistik. [Psychological notes on inheritance and familial statistics.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 67–74. 1918.

713. T. W. **Hybridization and cross-fertilization of flowers.** Gard. Chron. 65: 46. Jan. 25, 1919.—Author reviews article by John Heal on the same subject as above in which Heal states that *Vallota purpurea* failed to hybridize. [See Bot. Absts. 2, Entry 765.] This species was successfully crossed with *Cyrtanthus sanguinea* by author and the late Sir Trevor Lawrence. The small growing species of *Cyrtanthus* hybridize readily. Breeding *Fuchsias* is made difficult by marked deterioration in the progeny.—*Herbert Beaumont.*

714. Tildesley, M. L. **Preliminary note on the association of steadiness and rapidity of hand with artistic capacity.** Biometrika 12: 170–177. Nov., 1918.—Preliminary note based on data on 60 pupils with respect to age, years trained in drawing, artistic capacity, mathematical and musical ability, and steadiness and rapidity of hand as tested by three maze-problems of varying difficulty. Entrance of maze was at A and exit at Q, a continuous pencil track being drawn from A to Q. Performance was considered the better, the fewer "bumps" the pencil track made with boundaries of the maze path. A single measure of efficiency was obtained by combining number of bumps with time taken, the inverse product of the two being used. The slender material makes conclusions suggestive, at best. Steadiness and rapidity of hand are not the result of training, but are probably innate characteristics developing with age. For crafts in which these characteristics are essential, they can be obtained better by selection than by training. Good craft, mathematical ability, and musical ability are only slightly associated with rapidity of hand, but this association is an initial one (most marked in maze 1) and tends to weaken with experience. It is suggested that possibly certain faculties may be most intense at certain stages of growth, and if education seizes upon them at this stage and maintains their intensity, we may overlook their true origin and suppose them created by education. Other suggestions needing further investigation are made. —*J. A. Detlefsen.*

715. Transeau, Edgar Nelson. **Hybrids among species of Spirogyra.** Amer. Nat. 53: 109–119. *7 fig.* Mar.-Apr., 1919.—Hybridization between *Spirogyra communis* and *S. varians* and between *S. varians* and *S. porticalis* was observed in nature, and probable resulting hybrids were found. Character of zygote itself is always maternal, as would be expected from cytological behavior during conjugation. Reduction division is known to take place

during first two nuclear divisions of germinating zygote, followed by degeneration of three of the four nuclei. Segregation among hybrid filaments, therefore, is evident in first generation, but all cells of a given hybrid filament are alike. New combinations were observed as to shape and size of cells, shape and orientation of zygote. Natural hybridization among species of *Spirogyra* is, however, rare.—*Merle C. Coulter.*

716. Van Fleet, W. **New everbearing strawberries.** Jour. Heredity **10**: 14–16. *Fig. 7–8.* Jan., 1919.—See Bot. Absts. 2, Entry 732; 3, Entry 74.

717. Weatherwax, P. **Gametogenesis and fecundation in Zea Mays as the basis of xenia and heredity in the endosperm.** Bull. Torrey Bot. Club **46**: 73–90. *Pl. 6–7, 2 fig.* Mar., 1919. —Embryo sac arises from lowermost of row of four potential megaspores, the other cells disintegrating during its development. Egg nucleus is sister to one of polar nuclei. Antipodals organize a small tissue in chalazal end of sac, later absorbed. Two very small crescent-shaped sperms are developed from generative cell of pollen grain before dehiscence of anthers. Experiments showed that pollen tubes may grow through "silk" 25 cm. long in about twenty-four hours. Probably only forward end of tube is alive for perhaps 1 or 2 cm. Contents of pollen tube is usually discharged into one of synergids which break down shortly after, producing much confusion of cytoplasmic structure in micropylar end of sac. Guignard's observations on double fertilization were confirmed, the two fusions taking place almost simultaneously. Endosperm develops much more rapidly than embryo. Current explanations of cytological basis of xenia are supported. The peculiarities of xenia give to the endosperm a genetic significance and strongly suggest a sporophytic interpretation of this structure. Irregularities in distribution of chromosomes within endosperm makes possible a form of segregation of factors which may account in xenia for departures from expectations, and therefore the cytological data in general offers satisfactory interpretations of certain unusual behavior.—*B. M. Davis.*

718. Wheeler, William Morton. **Two gynandromorphous ants.** Psyche **26**: 1–9. *2 fig.* Feb., 1919.—Gynandromorph of *Lasius latipes* is combination of male and β-female. Female parts include entire middle of body (epinotum, petiole, hind legs), patches of head, other legs, and gaster, and strong tendency to deälation in hind wings only. Certain parts are intermediate. Internal structure could not be studied.—Second form described is dinergatandromorph (composite of male and soldier) of *Camponotus albocinctus*. Body is normal soldier, except smaller; head is much like soldier on left, resembles male on right. Appears to be first unmistakable case of soldier-male combination. Suggests that soldiers and workers are not determined by nutrition, but arise from different kinds of eggs. Author cites supporting evidence from termite castes, polarity of insect eggs, and experiments with castration; also regards new evidence as confirmatory of his theory that gynandromorph arises from pair of fused oöcytes. Discusses other hypotheses briefly.—*A. Franklin Shull.*

719. Wicks, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Arkansas Agric. Exp. Sta. Bull. 143. *19 p., 9 pl.* 1918.—See Bot. Absts. 2, Entry 733.

720. Wolff, Friedrich. **Ein Fall dominanter Vererbung von Syndaktylie.** **[A case of dominant inheritance of syndactyly.]** Arch. Rassen- u. Gesellschaftsbiol. **13**: 74–75. 1918.

HORTICULTURE

J. H. Gourley, *Editor*

721. Blake, M. A. **Winter injury to fruit trees in New Jersey.** Proc. Amer. Soc. Hort. Sci. **15**: 24–25. (1918) 1919.—New Jersey experienced the most severe winter in 1917–18 since official weather records have been kept. The severe weather set in early in December and continued for weeks. Flower buds of the peach were killed except in the more favorable sections. The Wickson plum suffered injury to the blossom buds, and cane fruits suffered in

the central and northern counties of the state. The Synder was the hardiest of the blackberries.—The most severe injury to trees themselves was with the peach where an unprecedented injury occurred to the roots even to a depth of 12–18 in., also considerable "collar" injury occurred, especially on the light soil types and upon dry knolls. The apple suffered similar injury but to a lesser degree; Gravenstein, Tompkins Co. King, Grimes and Baldwin suffered most. Varieties of peaches and apples which suffer most from root killing and collar injury are the ones that are the quickest to start into growth during favorable periods of winter and early spring.—*J. H. Gourley.*

722. BROCK, W. S. **Spraying apple trees in bloom.** Proc. Amer. Soc. Hort. Sci. 15: 80–81. (1918) 1919.—The apple varieties Ben Davis, Grimes, Winesap, Whitney, Lady, Westfield, Oldenburg and several other little known varieties were sprayed when in full bloom in three consecutive years, 1916–1918. The first spray was applied when the central bud opened, the second when the trees were in full bloom and the third two days later. Bordeaux mixture 4–4–100, lime sulphur 1:20 and scalecide 1:20 were used on different groups and the first two were both applied to certain trees. In all cases the trees were thoroughly drenched.—The results showed no injury to blooms with the exception of some yellowing and premature dropping of the petals where the lime-sulphur was used. The trees bore full crops of fruit.—It is suggested that an application of a fungicide during full bloom would be desirable, especially to scab-susceptible varieties.—*J. H. Gourley.*

723. CHANDLER, W. H. **Winter injury in New York state during 1917–1918.** Proc. Amer. Soc. Hort. Sci. 15: 18–24. (1918) 1919. The growing season of 1917 was one of the shortest on record, being at least three weeks shorter than normal. The temperature throughout the summer in many sections of New York was below normal and the rain-fall was heavy and as a consequence the wood went into winter in a poorly ripened condition. The winter was extremely cold and the duration of the cold periods was great. The feature of the winter that played such an important part in the injury that resulted was the low temperatures in December, for trees become more hardy as the winter advances. The fruit-growing regions of New York were visited during the summer of 1918 and the conditions recorded.—In Niagara, Orleans and Monroe counties the weather was the least severe, with a temperature ranging as low as $-7°$ or even $-12°$F. This temperature was reached in February rather than in December. While the buds and wood of most varieties of peaches were injured the J. H. Hale proved the most tender and Rochester the hardiest. Pears were injured to some extent in the sap-wood and also such apples as Baldwin, Rhode Island Greening and Tompkins Co. King, while many Hubbardston trees that fruited heavy in 1917 were entirely killed.—In Wayne county the temperature reached $-20°$ F. and peach trees were badly killed. The older the trees and the heavier the crop in 1917 the worse was the injury. Younger trees recovered rather well. Sweet cherries appeared only slightly injured in the spring but later proved to have been little hardier than the peach. Angoulene pear trees were largely killed and Bartlett, Bosc and Kieffer suffered seriously. There was much injury to both old and young wood of Baldwin, Rhode Island Greening, Tompkins Co. King and Hubbardston apples. Ben Davis, Northern Spy and Twenty Ounce were seldom injured in this section.—In the Ithaca section the temperature reached $-24°$ F. and peach trees were more severely hurt than in Wayne county, yet less than 20 per cent failed to recover in some degree and one-half were worth retaining. If such trees were treated with 4 pounds of nitrate of soda they recovered much faster. More than half of the sweet cherry trees died during the summer, while such hybrid varieties as Reine Hortense and May Duke showed some injury and made a weak growth in 1918, and Eugenia showed no injury whatever. Little injury occurred to the sour cherry. Pears were injured but not many killed. Wickson and other *Triflora* plums were severely injured with the exception of Burbank and Abundance varieties. Many varieties of apples suffered, the hardier ones being Ben Davis, Winter Banana, Wealthy, Twenty Ounce, Fameuse, McIntosh, Oldenburg, and other Russian sorts.—In Oswego county, where the temperature went still lower, even the Northern Spy and Wealthy were injured and many Baldwins were killed.—In Champlain county, where $-30°$ F. was recorded, trees of Fameuse were

killed and some injury occurred to McIntosh and Oldenburg.—In the Hudson river section the temperature was as low as in Wayne and Ontario counties, but there was much less injury to all fruits with the exception of Baldwin apples that had fruited in 1917. This region had little rainfall the fall previous, and the trees were more mature than in the other sections where the rainfall was heavy. Some root-killing occurred in this region on the drier soils.—A discussion is given concerning the nature of the injury and tissues involved, also on the duration of cold which will cause killing of buds and wood of the common fruits. Apparently a close relation exists between maturity (or power to resist cold) and the amount of foliage. If trees were defoliated or partially so the branches from which leaves were removed were much more tender. This seems to indicate that "something must come from the foliage during the late season that results in a change, perhaps in the nature of the protoplasm such that it becomes more resistant to freezing."—*J. H. Gourley.*

724. Connors, C. H. **Methods in breeding peaches.** Proc. Amer. Soc. Hort. Sci. 14: 126–127. (1917) 1918.—In an attempt to secure a number of peach stones by crossing known parents it was found that ordinary yellow paper sacks or bags of mosquito bar were not satisfactory. The paper bags caused a yellowing of foliage and hindered the proper development of the fruit while the mosquito bar bags had other disadvantages. Finally large tents of cheese cloth were built about the entire tree. The primary part of the work was to study inheritance of size of blossoms. The varieties used were Greensboro with large blossoms, Belle with medium blossoms, and Elberta and Early Crawford with small blossoms. Trees were divided into four equal parts and three parts were emasculated and pollinated with each of the other varieties. The fourth part was left to be self-pollinated. After the fruits had set, the tents were taken down and the fruits left to mature to almost the point of dropping. They were then picked, the stones removed, dried and placed in sand for stratification. In the spring they were opened and planted in nursery rows. The seeds of the early Clingstone varieties would not mature. Early freestones or semi-clings, such as Carman and St. John gave a small percentage from stone to tree, about 10 per cent, while the later freestones gave about 50 per cent. A total of 403 trees descended from known parents was planted in 1916 and 1073 seedlings from known parents were planted in 1917. In addition to the above there were planted also 258 seedlings from open pollinated blossoms. [See Bot. Absts. 3, Entry 608.]—*E. C. Auchter.*

725. Gourley, J. H. **Sod, tillage and fertilizers for the apple orchard. A ten-year summary.** New Hampshire Agric. Exp. Sta. Bull. 190. *40 p., 6 fig.* 1919.—This paper reports a ten-year summary on an experiment with cultural practices and the use of fertilizers in a mature Baldwin apple orchard. The location of the orchard was such that the trees suffered from spring frosts or winter injury in six out of the ten years which lowered the average yield of the trees. The trees which remained uncultivated and unfertilized throughout the period of the experiment did not yield sufficiently well to warrant the use of the land for orcharding and they also made an inferior growth. The average yield was 135 pounds of fruit per tree and 5.09 inches twig growth per year. Tillage every other year resulted in a decided benefit to the trees which under farm conditions in New Hampshire might prove satisfactory, but better results were obtained by other methods of culture. The average yield of the two plots under this treatment was 191 pounds per tree and 6.11 inches twig growth per year. Clean cultivation, without the use of cover crops or fertilization, proved to be a successful method of reclaiming a run-down orchard, increasing the yield over the sod grown trees by 94 per cent and the twig growth by 43 per cent. It has shown evidence, however, that it could not be continued over a long period of years without additional fertility, since at the end of the ten-year period the trees were not making as good an average growth as at the end of the five-year period. Tillage with cover crops proved to be a slightly better system to follow in this orchard than clean tillage, but here the growth of the trees failed to maintain as good a growth in the second five-year period by 18 per cent. The yield of this plot was 268 pounds per tree and 8.21 inches twig growth per year.—Five plots which received the cultivation-cover crop system of culture were also treated with varying amounts of a complete fertilizer. These treatments resulted in an increased growth of the trees which averaged

.2 per cent greater than the cultivation-cover crop plot. The yield of these plots, however, lid not increase more than the untreated one, averaging 225 pounds per tree. The difference n yield in favor of any of the combinations of complete fertilizer used was not preponderant. :t is suggested that the increase in size of the trees should result in an increased yield in the ıear future. The fertilizer which was richest in potash produced the largest apples each rear and the quality of them was somewhat better.—Lime had no obvious effect upon the ›rchard.—The experiment is to be continued.—*J. H. Gourley.*

726. HENDRICKSON, A. H. **The common honey bee as an agent in prune pollination.** Caliornia Agric. Exp. Sta. Bull. 291: 215–236. *13 fig.* 1918.—This is the second report of the part ›layed by the honey bee in the pollination of prunes in the Santa Clara Valley. The experinent was carried on in 1917. The varieties French and Imperial prune were used in the test. Three trees of each variety were worked with, making a total of six. The trees were covered vith mosquito bar tents. Two double tents were erected, each enclosing a pair of adjoining French and Imperial prunes. In only one of the double tents was placed a hive of bees. Polen carrying insects were excluded from the other double tent. Single tents covered the two emaining trees, a French and an Imperial. In each single tent was placed a hive of bees. The results showed quite strikingly in the case of the French prune, that although it is apparıntly self-fertile, still bees were needed to distribute the pollen sufficiently to cause even a ight set of fruit. The tree enclosed with bees set 19 per cent while the trees from which ›ees were excluded set 0.43 per cent. The French tree enclosed with the Imperial and bees ıet 5.5 per cent. The average orchard set for this variety was 13.2 per cent.—Quite similar esults were secured with the Imperial prune. Although not as self-fertile as the French, ıtill bees caused a set of 3.02 per cent as compared to a set of 0.34 per cent where bees were ›xcluded from the tent. The Imperial tree was plainly benefited by cross pollination with ;he French tree. Both tests showed that even where the two trees were under the same tent vith bees excluded the set was practically nil in both cases. Under the same tent but with ›ees present a very good set was obtained, thus again proving the great value of bees.—Or:hard counts for three years of certain French trees, some only one row away from the Im›erial and others five rows away, showed in each case a slightly larger percentage of set on ;he French trees next to the Imperials than on those farther away. The first row was nearer ;he bees and evidently more thoroughly worked by them. The average orchard set in 1916 vas 3.6 per cent for the French prune as compared to 13.2 per cent in 1917. It is suggested ;hat the much greater quantity of bees in the orchard in 1917 was at least partly responsible 'or this increase. Observations and reports from different orchardists likewise showed an ncrease of fruit in 1917, wherever bees had been placed in the orchard.—Heavily loaded trees n 1916 set a light crop in 1917 but made an unusually good vegetative growth. The reverse :ondition was also true. Trees that set lightly in 1916 made a good vegetative growth and ıet more heavily in 1917.—*E. C. Auchter.*

727. HENDRICKSON, A. H. **Five years results in plum pollination.** Proc. Amer. Soc. Hort. Sci. 15: 65–66. (1918) 1919.—This work was prosecuted with the object of securing :eliable data on the fertility-sterility problem of plums for commercial growers in California. Over 100,000 hand pollinations were made to determine the effects of selfing and crossing and :ecords were made on the normal set under orchard conditions which involved a count of ›ver 175,000 blossoms. As a result of this work it was determined that the following Japanese varieties are self-sterile: Combination, Kelsey, Satsuma, Burbank, Wickson, Sultan and Abundance. The Climax is evidently self-fertile or partly so. The Domesticas that are :learly self-sterile are: Clyman, Tragedy and Robe de Sergeant, while the Imperial is un:ertain. Grand Duke is probably self-sterile, and the French and Sugar prunes are undoubt›dly so. There were no cases of inter-sterility observed in either Japanese or Domestica plums. [See Bot. Absts. 3, Entry 635.]—*J. H. Gourley.*

728. MOORE, J. G. **Winter injury to fruits in Wisconsin in 1918.** Proc. Amer. Soc. Hort. Sci. 15: 31–32. (1918) 1919.—Injury to the various tree fruits is discussed briefly. The apple suffered no more than usual, while plum trees were more severely injured. The most serious injury occurred to the flower buds, particularly those of the Sour Cherry.—*J. H. Gourley.*

729. Norton, J. B. S. **The relation of time of blooming to ripening period in peach varieties.** Proc. Amer. Soc. Hort. Sci. 15: 66–67. (1918) 1919.—A tabulation is made from data given in Hedrick's Peaches of New York, to determine the relation of time of bloom and ripening of fruit with the peach. There appear to be many exceptions, but, in general, the later the blooming period the later the fruit ripens.—*J. H. Gourley.*

730. Norton, J. B. S., and C. E. Leathers. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull. 216: 175–226. 1918.—Several general factors detrimental to or those which hinder good seed production are first discussed. Among those discussed are lack of pollination, inbreeding, self-sterility, and crossing or mixing. The second part of the report discusses the factors which are detrimental to good seed production in several different horticultural plants. Difficulties in proper pollination are discussed as a factor in several of these plants. A bibliography is included. [See Bot. Absts. 1, Entries 628, 747; 3, Entries 276, 656.]—*E. C. Auchter.*

731. Paddock, W. **Winter injury in Ohio.** Proc. Amer. Soc. Hort. Sci. 15: 30–31. (1918) 1919.—The peach section about Port Clinton suffered seriously during winter of 1917–18, fully 90 per cent of trees above six years old were either killed or made nearly worthless. Fruit buds survived the winter on some trees that were so badly injured that no leaves were put forth during the following season and some of these blossoms matured their fruit. It was demonstrated that moderate pruning of frozen peach trees is better than light or severe pruning.—*J. H. Gourley*

732. Van Fleet, W. **New everbearing strawberries.** Jour. Heredity 10: 14–16. *Illust.* Jan., 1919.—The varieties of everbearing strawberries now being so largely grown in America are descendants of the Pan American, a sport or mutation of Bismark, a former commercial variety of the *Fragaria virginiana* type in which the runners are suppressed, favoring the successional production of fruiting crowns during the growing season. This characteristic appears to be hereditary in seedlings and hybrids of the Pan American. Progressive and Superb are the most widely grown varieties of the "everbearers," but they are poor plant makers. New seedlings are being grown of these and other varieties of this new type as well as crosses with the best spring-fruiting commercial varieties in order to add other desirable features to the everbearing varieties. The European Alpine strawberry *Fragaria vesca* is being used for crossing also as it has a long season of ripening.—A new type of *Fragaria vesca* has been introduced from Chili which appears promising. Seeds were forwarded from that country in 1914 by Prof. W. F. Wight and plants have been grown from them at Rockville, Maryland and Chico, California. The plants show greater vigor, fruitfulness and general adaptation to our climate than any Alpine which has been introduced. The plants have endured the hot, dry summers and fruited continuously from June until frost and also threw out a large number of strong runners. The berries were of good quality, but small and not firm enough for shipment. The stock is being used for further breeding work. Crosses were made with Chesapeake and Early Jersey Giant and about 400 plants fruited in the field in 1917 at Glendale, Maryland, showing high merit as June-fruiting varieties but displaying no tendency toward continuous bearing. Runners from two of the best plants were selected and crossed under glass early in 1917. Four of the resulting seedlings are very promising, producing large berries continually from July until November, and a good supply of vigorous runners. Crosses from this source appear likely to supplant those from the Pan American for commercial purposes.—*J. H. Gourley.*

733. Wicks, W. H. **The effect of cross-pollination on size, color, shape, and quality of the apple.** Arkansas Agric. Exp. Sta. Tech. Bull. 143: *19 p., 9 pl., 40 fig.* 1918.—Results of three years' investigation of the immediate influence or effect of the male parent on size, color, shape, and quality of the fruit of the female parent are given. The work was done during the years 1915–16–17 in a typical commercial orchard. The varieties used were Ben Davis, Jonathan, Winesap, and Grimes. In all cases, besides being selfed, each variety was crossed with the other three. During the three years a total of 11,290 pollinations were made, which

produced 773 apples of all varieties. The total per cent of fruit set for the three years for Grimes as a female was 49.26, Ben Davis 32.71, Jonathan 18.67 and Winesap 9.42. Winesap was also the most difficult variety from which to secure pollen. The greatest mutual affinity was shown to exist between varieties as follows: Ben Davis by Grimes, Grimes by Jonathan, Grimes by Ben Davis, Ben Davis by Jonathan. Cross pollination as a rule increased the percentage of fruit set. In a study of the crossed fruit, no influence of the male pollen of any variety could be detected on size, color, shape or quality of the fruit of the female parent. Light, plant food, temperature, and moisture are considered as more important in influencing these factors. The author concludes that the facts obtained justify apple growers in planting varieties primarily for the benefit of cross-pollination to secure the normal development of the apple.—*E. C. Auchter.*

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

734. ATKINSON, GEO. F. **The genus Endogone.** Brooklyn Bot. Gard. Mem. 1: 1-17, 1918.—This obscure fungus, variously placed in the course of its history in all the three great divisions of fungi, is placed by the author in the Phycomycetes, although it is said to approach close to certain Protoascomycetes. *Endogone sphagnophila* n. sp., growing on sphagnum, is described and comparisons are made with other species, especially with the subterranean *E. lactiflua* Berk. *E. sphagnophila* consists, when mature, of orange yellow, pulvinate bodies, 2-4 mm. in diameter, enclosed in a tough, white peridium, enclosing a mycelium made up of non-septate, branched coenocytic hyphae 10-15 μ in diameter. The two gametes are about equal in size and are multinucleate. An oval or elliptical zygote, 35-60 μ x 30-45 μ, is formed as an outgrowth from the point of conjugation of the pair of gametangia. The nuclei in the zygote (5-10 being derived from each gamete) appear to be associated and finally to fuse in pairs. Germination of these resting spores was not observed.—*E. W. Olive.*

735. DODGE, B. O. **Studies in the genus Gymnosporangium. I. Notes on the distribution of the mycelium, buffer cells, and the germination of the aecidiospore.** Brooklyn Bot. Gard. Mem. 1: 128-140. *Pl. 1., 5 fig.* 1918.—The author publishes observations on five species of *Gymnosporangium: G. Ellisii, G. biseptatum, G. transformans,* and *G. fraternum,* with telial stage on *Chamaecyparis,* and *G. clavipes,* with telial stage on *Juniperus.* The mycelium of *G. Ellisii* is intercellular and the fascicled hyphae invade every tissue except the cork. They are especially abundant along some of the medullary rays. Haustoria are not abundant but may be found occasionally in cells of the cortex medullary rays. In *G. biseptatum,* the intercellular mycelium is distributed through the cortex down as far as the cambium. The abundant haustoria are strikingly large. In *G. clavipes,* them ycelium is intercellular and lies for the most part well out in the cortex just beneath the cork. This species may develop spores in one year if found near the growing point where food is abundant; or the development may take two years if the infection is in regions less favorable. Strictly foliicolous, superficial sori may also develop, in which case the mycelium is limited in extent. *G. transformans* and *G. fraternum* are two leaf-inhabiting forms on *Chamaecyparis,* the former having its aecial stage on *Aronia,* the latter on *Amelanchier.* Haustoria are especially abundant in *G. fraternum,* sometimes eight or ten to a cell, but commonly two to four. In *G. transformans,* haustoria are only occasionally met with, in palisade and mesophyll cells. Other distinctive features are the buffer cells formed in the telial sori, which are especially long and prominent in *G. fraternum;* and the 2-celled teleutospores, which are also comparatively long in the latter species. The binucleated aecidiospores of *G. transformans* commonly divide at once, on germination, to make four-nucleated germ-tubes.—*E. W. Olive.*

736. MCDOUGALL, W. B. **Development of Stropharia epimyces.** Bot. Gaz. 67: 258-263. *10 fig.* 1919.—The development of the fructification of this species from a very early stage of

the carpophore is described. The first internal differentiation of the carpophore is the appearance of the hymenophore primordium. The annular gill cavity is soon formed and enlarges rapidly. The universal veil disappears before the carpophore is mature. The development of the lamellae is similar to that of *Agaricus Rodmani* as described by Atkinson. This species agrees with *Agaricus*, *Armillaria* and *Stropharia* in having the hymenophore primordium develop before those of the pileus and stem, thus constituting an addition to the third of the three groups into which Atkinson divides the Agricaceae with endogenous origin of the hymenophore. A close relationship between *Agaricus* and *Stropharia* is suggested. [See Bot. Absts. 2, Entry 1001.]—*E. W. Sinnott.*

PTERIDOPHYTES

737. Brown, Elizabeth Wuist. **Regeneration in Phegopteris polypodioides.** Bull. Torrey Bot. Club 45: 391–397. 3 *fig.* 1918.—Spores of this species were sown on Prantl's and Knop's nutrient solution and allowed to develop without changing. The primary leaves of the resultant sporophytes, mostly apogamous, were cut and placed on sand or inserted in it to a depth of from 1 to 2 mm. and moistened with the same solution or with distilled water. In only one case regeneration resulted, appearing near the base of a detached leaf of a young sporophyte. A cellular mass, resembling a prothallium, was formed, from which rhizoids, intermediate structures between leaves and prothallia, and true leaves, developed. These true leaves resembled those of normal young sporophytes and were followed by leaves of a much simpler type.—*F. G. Smith.*

738. Steil, W. N. **A study of apogamy in Nephrodium hirtipes, Hk.** Ann. Bot. 33: 109–132. *Pl. 5–7.* 1919.—A summary is presented of the literature upon apogamy in ferns. The prothallium of the species studied develops from a spore, and attempts to induce typical apospory have been rarely successful, though the development of secondary prothallia from young sporophytes is readily induced by cultural conditions. The gametophyte never produces archegonia, but normal antheridia and antherizoids are formed. The embryo arises as a vegetative outgrowth of the prothallium, the apical cell of the leaf appearing first, then that of the root and then that of the stem. The foot is absent. The later development of the embryo resembles that of ferns where the embryo arises from fertilization. No nuclear migrations or fusions were observed in the prothallium at the time when the embryo begins its development. Sporogenesis in this species was also studied. After 8 sporogenous cells have been produced in the sporangium, they undergo incomplete division as a result of which the nucleus of each contains the diploid number of chromosomes—between 120 and 130. These cells function as spore mother cells and the (normally) 32 spores produced have the haploid number of chromosomes, which number is retained in the cells of the gametophyte and the apogamous sporophyte. The author discusses the origin of apogamy in this species.—*E. W. Sinnott.*

739. Watson, E. E. **Relation between habitat and structure in Pteris aquilina.** Rept. Michigan Acad. Sci. 20: 246. 1918.—The diverse habitats in which this fern grows produce noticeable structural differences as to cell size, number of stomata in the leaf, and amount of interfascicular mechanical tissue in the petiole. [See Bot. Absts. 2, Entry 882.]—*E. F. Woodcock.*

SEED PLANTS

740. Buchholz, John T. **Studies concerning the evolutionary status of polycotyledony.** Amer. Jour. Bot. 6: 106–119. 25 *fig.* 1919.—In the development of the embryo of a number of species and genera of conifers the author finds no indication of the splitting of cotyledons, but brings forward evidence that fusions between cotyledonary primordia occur during development, the average number of primordia in young embryos being consistently greater than the average number of mature cotyledons produced. This excess of primordia is believed to be a recapitulation of a more primitive condition where the cotyledons were more numerous. The primitive gymnosperm embryo had numerous, imperfectly cyclic cotyledons, probably

lerived from spirally arranged leaves. "Cotyledonary fusions reduced the number of cotylelons and also produced cotyledonary tubes in many species. Dicotyledony was attained either by a general fusion of many cotyledons in two groups, or by an extremely bilabiate development of a cotyledonary tube, and monocotyledony is the result of a cotyledonary tube becoming unilabiate in the course of its development. The polycotyledonous condition is therefore primitive and the dicotyledonous one is derived."—*E. W. Sinnott.*

741. Clark, F. R. **Bud formation of plant hypocotyls.** Rept. Michigan Acad. Sci. 20: 146. 1918.—The author experimented on seedlings which do not normally produce buds along the internode of the hypocotyl. The tops were removed so that only this internode remained above the ground. *Solanum dulcamara* regenerated at its tip a new top, the first growth being observed at the end of 2 weeks. In plants of *Linum sp.* new growths appear from the side of the hypocotyl rather than from the tip.—*E. F. Woodcock.*

742. Coutant, Mary Wotherspoon. **Wound periderm in certain cacti.** Bull. Torrey Bot. Club 45: 353–364. *Pl. 9, 3 fig.* 1918.—The two species studied were *Opuntia versicolor* Engelmann and *O. discata* Griffiths, growing in the vicinity of Tucson, Arizona. The anatomical structure of the stems, essentially identical, is described, especially the mature periderm, which is made up of alternating zones of suberized thin- and lignified thick-walled tissue. Wounds were made by slitting the stems with a razor or piece of glass, never more than to the center of the pith. Examination of the wounds on successive days showed the following results: a loss of starch in the region parallel to the wound and an increase of oxalate in the most exposed cells; the appearance in this starchless area of a meristematic layer, the phellogen; the discoloration and lignification of the cells outside of this; the storage of starch by the cellulose-walled phelloderm; the production by the wound-phellogen of alternating layers of thick and thin-walled cells; and the formation of a second interior meristematic layer, which produces new vascular bundles parallel to the wound surface.—*F. G. Smith.*

743. Dorety, Sister Helen Angela. **Embryo and seedling of Dioon spinulosum.** Bot. Gaz. 67: 251–257. *Pl. 10–11.* 1919.—The general structure and the vascular anatomy of the embryo and seedling of this species is not markedly different from the ordinary cycad type, despite the large size of the whole plant and of the ovulate strobilus and ovules. The cotyledons vary from 2 to 4 in number, are often deeply lobed and are multifascicular. Extrafascicular cambium is absent. The large size of the stem makes possible a clear demonstration of the origin and course of the complicated "girdling" leaf traces.—*E. W. Sinnott.*

744. Gleason, H. A. **Scirpus validus for demonstrating procambium.** Rept. Michigan Acad. Sci. 20: 153. 1918.—*Scirpus validus* is exceptionally fine for demonstrating procambium, since this plant grows from a basal meristem, and in a single cross section there may be seen all stages in the development from minute procambium areas of a few cells to bundles of mature form and size.—*E. F. Woodcock.*

745. Hayden, Ada. **The ecologic subterranean anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. 6: 87–105. *Pl. 15–28.* 1919.—A study of the gross and minute structure of the subterranean organs of 32 species of prairie seed plants, with particular reference to their physiological anatomy. In plants of dry habitats, mechanical tissue is abundantly produced and parenchymatous tissue reduced in amount. In moist habitats this condition is reversed. The amount of vascular tissue seems not to be closely correlated with habitat. Aerenchyma is abundant in swamp plants. The subterranean stem is the equivalent of the primary root, functionally, and is more efficient than the root in propagation. Attention is called to the usefulness of the pith as a water reservoir.—*E. W. Sinnott.*

746. Kitchin, P. C. **The Relation between the Structures of Coniferous Woods and their Penetration by Preservatives.** Rept. Michigan Acad. Sci. 20: 203—221. *Pl. 11-12.* 1918.—A careful study of the individual tracheids of *Larix laricina* and *Larix occidentalis*, with reference to their role as conductive structures in the penetration of preservatives. Though

similar in most of their characters, they differ in those structures most concerned in the passage of creosote oil into wood, i.e.,—in their penetrable bordered pit area. This area is the pit membrane less the torus, and seemed to be the only factor which showed a consistent relation to the penetration of preservatives. At a pressure of 100 pounds per sq. in. for 30 minutes, with the oil at a temperature of 20°C. *Larix laricina* with a penetrable pit area of 0.01100 sq. mm. gave a longitudinal penetration of 0.15 inches, while *Larix occidentalis*, with a penetrable pit area of 0.01798 sq. mm. had a longitudinal penetration of 0.31 inches. The simple pit areas varied in each of the various species studied and there was no evidence available that they were a factor in the preservative penetration. The appendix includes measurements of the penetrable bordered pit area per mm. of tracheid length for several species of Pinus and one of Abies, as well as the penetrations on one specimen each of *Tsuga canadensis*, *Picea excelsa*, *Pinus taeda*, and *Pinus lambertiana*. [See Bot. Absts. 2, Entry 883.]—*E.F. Woodcock.*

747. Maillefer, Arthur. **Parthenocarpie d'Aristolochia Sipho. [Parthenocarpy in Aristolochia Sipho.]** Archives Sci. Phys. et Nat. Geneva **46**: 90–91. 1918.—The examination of fruit of *Aristolochia Sipho* which apparently developed normally without fertilization showed, however, that the ovules were reduced to a spongy mass without anatomical differentiation.—*A. J. Eames.*

748. Record, Samuel J. **Mahogany and some of its substitutes.** Jour. Forestry **17**: 1–8. 1919.—A key based on the gross characters of the woods is presented and is supplemented by descriptions of such structures as may be seen on a smoothly cut surface with the aid of a lens magnifying 10 to 15 diameters. Most of the important woods known to the trade as "mahogany" and also some woods commonly substituted are included. Representatives of 13 families and 27 genera, 11 of which belong to the Meliaceae, are described.—*Eloise Gerry.*

749. Salisbury, E. J. **Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.** Ann. Bot. **33**: 47–79. *20 fig., 10 tables.* 1919.—Meristic and substantive variations in the flowers of these species are described in detail. Meristic variation is mainly the outcome of two tendencies—fission (producing an increase in number) and fusion (producing a decrease). It may occur in all floral regions and its appearance in one part of the flower is usually correlated with its appearance in the other parts. Instances of branched stamens and carpels and of bifurcated petals are recorded. The supernumerary perianth segments have from their position apparently originated by fission, and only rarely do we find evidence that they have increased as a result of the transformation of other structures. The occasional appearance of a single pentamerous whorl in species which normally have a 2-whorled, trimerous perianth is probably due to a fusion between a member of the outer whorl with one of the inner. The curve of meristic variation in the androecium and gynoecium exhibits several maxima which correspond to numbers that are some multiple of three, and the author concludes that the flower of the Ranunculaceae was primitively trimerous, a point of interest in connection with possible relationships between this family and the monocotyledons. Substantive variations, in the nature of transitions between different floral organs, are not uncommon, and throw much light on the origin of the perianth. This the author believes to have been derived either entirely from modified foliage leaves or in part from bracts and in part from stamens. [See Bot. Absts. 2, Entry 703.]—*E. W. Sinnott.*

750. Woodcock, E. F. **Structure of Mature Seed of Eriogonum microthecum.** Rept. Michigan Acad. Sci. **20**: 233–235. 1918.—The storage region inside the seed coats is endosperm and is differentiated into a central starch-containing region and an outer layer one cell in thickness which contains aleurone. The embryo lies in a median cavity in the starchy endosperm in such a position that the flattened cotyledons are turned back so that their basal end is toward the chalazal region, and their tips toward the micropylar region. The storage tissue is endosperm, not perisperm as suggested by Johnson, and the embryo is curved, not straight as commonly stated.—*E. F. Woodcock.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

751. CHAMBERLAIN, C. J. **The Living Cycads.** Univ. Chicago Science Series. *172 p. 91 fig.* Univ. Chicago Press: Chicago, 1919.—An elementary and more or less popular account of the Cycads, the two concluding chapters of which, devoted to the Evolution of Structures and the Lines of Evolution, are compact accounts of the evolutionary trends in the cycad phylum as they are understood by the author.—*E. W. Berry.*

752. ELLIS, DAVID. **Phycomycetous fungi from the English Lower Coal Measures.** Proc. Roy. Soc. Edinburgh 38[2]: 130-145. [No. 13] *Pl. 1, 8 text fig.* 1918.—Fossilised hyphae with an occasional fructification are well known to every Paleobotanist who works with anatomically preserved petrifactions to be extremely prevalent in all the horizons from which fossil plants have been described. Nevertheless remarkably few adequate descriptions of fungi have been published, and of those still fewer have been convincingly illustrated.—Until a much larger number of facts has been accumulated, any scientific consideration of the evolution or early distribution of the groups is impossible, so that descriptions of forms are to be welcomed. Dr. Ellis describes under the name *Palaeomyces bacilloides* hyphae with probable organs of reproduction from the Lower Coal Measures. The plant is described as saprophytic, found in the leaf-base of *Lepidodendron.* Renault's species, *Palaeomyces gracilis,* Ellis re-describes and re-names, placing it in the genus *Peronosporites.* His text figure 2 is a little startling, but the paper is on the whole well illustrated.—*M. C. Stopes.*

PATHOLOGY

DONALD REDDICK, *Editor*

753. ALCOCK, N. L. **On the life history of the rose blotch fungus.** Kew Bull. Misc. Inf. 1918: 193-197. *Pl. 6, 2 fig.* 1918.—*Actinonema rosae* seems to winter in England only in the conidial stage as diligent search for the ascigerous stage has resulted in failure. This is comparable to the behavior of *Venturia inaequalis* in England and America. Similarly the two fungi in England produce lesions on the new wood in which the organisms hibernate and produce conidia abundantly the following year. Such lesions of *A. rosae* have been found on the varieties Juliet, Madame Ravary, La Tosca, Mrs. David Jardine, Gruss an Teplitz. Sections through acervuli on canes are illustrated.—Recent literature on the disease and its control is reviewed.—*D. Reddick.*

754. APPEL, O. **Über die Anfälligkeit und Widerstandsfähigkeit verschiedener Kartoffelsorten gegen Krebs.** [**On susceptibility and resistance of varieties of potatoes to wart.**] Arb. Ges. Förderung Baues u. d. wirtsch. Zweckmässigen Verwendüng der Kartoffeln Bull. 15. 1918.—Compilation of data showing that more varieties are susceptible to the wart than are resistant.—Time of maturing does not influence susceptibility.—Of 170 varieties tested the following 13 are resistant: Arnika, Danusia, Hindenburg, Ideal, Jubel, Juli, Lech, Magdeburger Blaue, Nephrit, Nieren rote Delikatessen, Roma, Salat neue, Sechswochen. [From abst. by O. VON KIRCHNER in Zeitschr. Pflanzenkr. 28: 344. 1918.]—*D. Reddick.*

755. BRUNER, STEPHEN C. **La pudrición del tomate y modo de evitarla.** [**Decay of tomatoes and methods of prevention.**] Rev. Agric. Com. y Trab. [Cuba] 1: 300-301. *2 fig.* 1918.—A report of investigations relative to the cause of decay in tomatoes exported to the United States. The losses are attributed chiefly to faulty methods of handling the fruit prior to shipping. Specific troubles mentioned are blossom-end rot, sunburn, the leaf diseases due to *Cladosporium fulvum, Alternaria solani, Septoria lycopersici,* decay in green and mature fruit due to *Rhizoctonia,* ripe-rot due to *Mucor,* a decay of green and ripe fruit caused by *Phytophthora,* supposedly the species *P. terrestria,* and decay due to *Phoma destructiva.* Recommendations for avoiding losses resulting from the decay of fruit in transit are given.—*S. C. Bruner.*

756. Bruner, Stephen C. **Enfermedades de la vid en Cuba. [Diseases of the grape in Cuba.]** Rev. Agric. Com. y Trab. [Cuba] 1: 406–409. *5 fig.* 1918.—A report relative to the diseases of the grape known to occur in Cuba. Downy mildew (*Plasmopara viticola*), powdery mildew (*Uncinula necator*), black rot (*Guignardia bidwellii*) anthracnose (*Gloeosporium ampelophagum*), leaf blight (*Cercospora viticola*) and rust (*Uredo vitis*) are reported. A brief description of each disease with suggestions for control are given.—*S. C. Bruner.*

757. Bruner, Stephen C. **La "Phomopsis" de la berenjena. [Phomopsis disease of egg plant.]** Rev. Agric. Com. y Trab. [Cuba] 1: 468–469. *2 fig.* 1918.—Note giving recommendations for the control of the eggplant disease due to *Phomopsis vexans*, based on the results of investigations conducted by the Florida Agricultural Experiment Station. The foot-rot or tip-over phase of the disease is reported as being the cause of serious losses in Cuba and the use of healthy seed is considered of especial importance in avoiding this trouble.—*S. C. Bruner.*

758. Crittenden, C. G. **Pecan diseases other than scab.** Georgia State Bd. Ent. Bull. 49: 44–48. *Pl. 12–13.* 1918.—The following diseases are described briefly: rosette (nonparasitic); brown leaf spot (*Cercospora fusca*); kernel spot (*Coniothyrium caryogenum*); nursery blight (*Phyllosticta caryae*); anthracnose (*Glomerella cingulata*); crown gall (*Bacterium tumefaciens*); mildew (*Microsphaera alni*).—*D. Reddick.*

759. Darnell, Smith, G. P. **Diseases of tobacco plants: blue mold and a bacterial disease.** Agric. Gaz. New South Wales 29: 82–88. *3 fig.* 1918.—Popular discussion of blue mold caused by *Peronospora hyoscyami*.—A disease following mold and thought to be bacterial in nature is described.—Brief descriptions of other diseases of tobacco including those caused by *Phytophthora nicotianae* and *Bacillus nicotianae*.—*D. Reddick.*

760. Doidge, Ethel M. **The characteristics of citrus canker and its eradication.** S. Afric. Dept. Agric. Bull. 3. *9 p., 13 fig.* 1918.—Popular description of the disease, means of dissemination of *Bacterium citri*, and the measures employed in South Africa to eradicate the disease.—The disease was introduced from Japan in 1905. Its subsequent spread has been confined practically to wet seasons. Bordeaux mixture has not proved an effective preventive. In 1917 further outbreaks occurred and in December of that year a sum of money was granted for eradication of the disease. All nurseries whether infected or not have been destroyed and the owners compensated. About 15,000 orchard trees have been found infected and destroyed by fire. Up to March 31, 1918, £28,000 was expended for inspection of orchards and nurseries and the eradication (including compensation) of infected trees.—*D. Reddick.*

761. Dufrenoy, J. **Les conditions écologiques du développement des champignons parasites. Etude de géographié botanique. [Ecological conditions in the development of parasitic fungi.]** Bull. Soc. Mycol. France 34: 8–26. 1918.

762. Dufrenoy, Jean. **Sur les tumeurs du pin maritime. [Tumors of the pine.]** Compt. Rend. Acad. Sci. Paris 166: 355–357. 1918.—Resin-exuding galls are abundant on the trunks and roots of maritime pine [*Pinus pinaster*?] in the Arcachon forest. The structure of the gall is described in some detail. Two kinds of cocci were observed and isolated and are thought to be the cause of the trouble.—*D. Reddick.*

763. Earle, F. S. **La Diplodia natalensis.** Rev. Agric. Com. y Trab. [Cuba] 1: 50. 1918. —A brief note. The author comments on an article by Bruner relative to *Diplodia natalensis* and gives the results of his own infection experiments with this fungus on citrus fruits. The organism penetrates the calyx, after which it finds ready access to the interior of the fruit by way of the peduncle.—*S. C. Bruner.*

764. Fisher, D. F. **Apple powdery mildew, and its control in the arid regions of the Pacific northwest.** U. S. Dept. Agric. Bull. 712. *28 p., 3 pl. 3 fig.* 1918.—Presence of powdery mildew (*Sphaerotheca leucotricha*) on apples (*Pyrus malus*) in arid Northwest may cause 50

per cent loss.—Experiments in pruning out infected twigs did not give satisfactory control, nor did spraying the trees while dormant with lime-sulfur solution. Use of sulfur sprays in the growing season gives control but injury, especially to fruit, is likely to result.—Under the conditions the following spraying program has proved best: Lime-sulfur solution (1-50) when the blossoms show pink and again when the blossoms have fallen; ammoniacal copper carbonate (5:3:50) three to four weeks after the second application.—Many fungicides were tested including colloidal sulfur, a formula for the preparation of which, is given.—*D. Reddick.*

765. HARTER, L. L. **A hitherto-unreported disease of okra.** Jour. Agric. Res. 14: 207-212. *Pl. 23.* 1918.—Disease occurs only on stems and pods of okra (*Abelmoschus esculentus*) where it appears as oval to oblong spots 2 to 3 cm. long.—Cause of the disease is *Ascochyta abelmoschi*, which is described as new. Abundant pycnidia are produced on the lesion and mycelium grows through the pod and into the seed from which it was isolated repeatedly. Pathogenicity was determined by experiment. Specific tests to infect leaves were unsuccessful. [See Bot. Absts. 1, Entry 409.]—*D. Reddick.*

766. HOFFER, GEORGE N., A. G. JOHNSON, AND D. ATANASOFF. **Corn-root rot and wheat scab.** Jour. Agric. Res. 14: 611-612. 1918.—The species of *Gibberella* occurring on corn (*Zea mays*) stalks and on wheat (*Triticum aestivum*) cross infect and are probably identical.—Confirming the experimental inoculation work, field observations have shown a conspicuously greater abundance of wheat scab in fields where wheat was grown immediately following corn that was infected with the Fusarium rot of root and stalk.—*D. Reddick.*

767. HUMBERT, J. G. **Tomato diseases in Ohio.** Ohio Agric. Exp. Sta. Bull. 321: 157-196. *12 fig.* 1918.—The symptoms, cause and control of the various parasitic and non-parasitic diseases affecting tomatoes in Ohio are considered. Fusarium wilt-resistant tomato trials for 1916 and 1917 are reported. The Acme strain as selected by Edgerton in Louisiana for Fusarium wilt resistance was immune to this disease under Ohio conditions and also exhibited resistance to Septoria and Alternaria leaf diseases. Beauty strains from Tennessee were highly resistant to this disease. Bonny Best, Acme and Early Detroit have responded to selection for disease resistance. Correlation of the prevalence of tomato diseases about Marietta with weather conditions for the growing periods over a 7-year interval show that a constant relationship evidently exists between high temperatures with low precipitation and a serious occurrence of Fusarium wilt and point rot.—*H. W. Dye.*

768. JENKINS, ANNA E. **Brown canker of roses, caused by Diaporthe umbrina.** Jour. Agric. Res. 15: 593-599. *Pl. D (colored), 46-47, 3 fig.* 1918.—The disease is known to occur in Eastern United States and probably is widely distributed. Cankers occur on any portion of the cane, the lesion being raw umber in color and sometimes surrounded by a purple border.—A technical description, with illustrations, of *Diaporthe umbrina* n. sp. is included. The pycnidial stage is like species of *Phomopsis*. Perithecia and pycnidia occur on the lesions and both have been developed in culture.—Proof of the pathogenicity of the organism is furnished.—Experiments in controlling the disease by cutting out and burning affected canes gave negative results.—*D. Reddick.*

769. JOHNSTON, J. R. **El plátano y sus enfermedades. [The banana and its diseases.]** Rev. Agric. Com. y Trab. [Cuba] 1: 419-421. *3 fig.* 1918.—Short account of the diseases of the banana plant (*Musa paradisia and M. sapientum*). The panama disease due to *Fusarium cubense* has caused serious losses in Cuba, being especially destructive to the varieties "manzano" and "Johnston." Recommendations for its control are given. Other diseases discussed are: root disease due to *Marasmius stenophyllus*; bud rot of the variety "macho" (possibly of bacterial origin); fruit rot (*Gloeosporium musarum*) and collar rot (cause not determined).—*S. C. Bruner.*

770. JOKL, MILLA. **[Pythium conidiophorum nov. sp., ein Parasit von Spirogyra.]** Osterr. Bot. Zeitschr. 67: 33-37. *1 pl.* 1918.—[From abstr. by MATOUSCHEK in Zeitschr. Pflanzenkr. 28: 344. 1918.]

771. Jones, Donald F. **Segregation of susceptibility to parasitism in maize.** Amer. Jour. Bot. 5: 295–300. 1918.

772. Keitt, G. W. **Inoculation experiments with species of Coccomyces from stone fruits.** Jour. Agric. Res. 13: 539–569. *Pl. 55–59., 3 fig.* 1918.—"This work has defined rather than solved, certain fundamental problems regarding host relationships and specialization of parasitism within the group of fungi under investigation." From the standpoint of host relationships, the strains of fungi studied are tentatively grouped as follows, according to the hosts from which they were procured: (1) *Prunus cerasus*, *P. avium*, *P. mahaleb* and *P. pennsylvanica*, (2) *P. domestica*, (3) *P. virginiana*, (4) *P. serotina*; but minor variations occur among the strains within the groups.—*P. mahaleb* was infected in varying degrees by inocula from all the host sources tested. *P. insititia* is also notably susceptible and possibly also *P. cerasifera*. *P. serotina* and *P. virginiana* on the other hand are notable for their resistance to cross infection, while *P. padus* was infected only by strains from *P. virginiana*. It appears from these tests that in Wisconsin no serious infection of cultivated cherries is induced by inocula from wild hosts (possibly excepting *P. pennsylvanica*) but it is evident that *P. americana* may act as a harborer of infectious material for cultivated plums. [See Bot. Absts. 1, Entry 419.]—*D. Reddick.*

773. Kiessling, Ludwig. **Über schädliche Nebenwirkungen der Formalinbeizung des Saatgutes auf die Keimung.** **[The injurious secondary effects of the formalin treatment of seed grain, upon germination.]** Jour. Landw. 66: 7–51. 1918.—Kiessling finds that commercial formaldehyde in the usual diluted solutions produces a distinctly injurious effect upon the vigor with which seed grain germinates. Soil conditions may therefore materially influence the injury which is apparent when the seedlings emerge. This injurious effect is intensified by agitation of the seed during treatment in a solution of formaldehyde, in the same way as if the treatment were prolonged or the solution made stronger. Using the ordinary treatments, it was found that mechanical injury of the seed, even of the embryo, did not materially increase the injury to wheat by formaldehyde. Poor seed may be temporarily benefited; but the residual effect of the treatment is generally worse with such seed. However, individual lots of seed differ widely in their reaction to the injurious effect of formaldehyde, and for various reasons.—An apparent stimulus to germination is sometimes evident. This may be due to the removal of certain inhibiting organisms, such as would occur on poor seed, or, in the case of new seed in which the germ has not yet attained full maturity, to an effect resembling the stimulus of narcotics. Such a stimulating effect may serve to neutralize the injury caused by treatment and confuse the results of a whole series of tests.—Impurities do not change the character of the effect of formaldehyde on seed grain, but generally do intensify it. Methyl alcohol is not the only impurity which may be concerned.—It is found that the dry storage of treated wheat is less injurious than storage under moist conditions. Treated wheat should be planted at once, however, and not stored if storing can be avoided. Oats were not found to be injured by storage after treatment.—Some reagent other than formaldehyde for the disinfection of seed grain is very much to be desired. Hiltner's formaldehyde mixtures (sublimoform and cupriform) are considered preferable because of the reduced proportion of formaldehyde required.—The compulsory treatment of seed grain is not considered feasible because of the risk of injury to germination by any of the treatments which have been devised and recommended for use in prevention of the smuts and other seed-borne diseases of cereals. It is also evident that commercial seedsmen cannot make use of formaldehyde to disinfect seed grain for sale, particularly wheat.— *Alden A. Potter.*

774. Lee, H. Atherton. **Further data on the susceptibility of rutaceous plants to citrus-canker.** Jour. Agric. Res. 15: 661–665. *Pl. 60–63.* 1918.—Needle-prick inoculation tests made in the Philippine Islands with *Pseudomonas citri* upon 24 species representing 20 genera of the family Rutaceae show that 19 of the species are susceptible in greater or less degree.—*Severinia buxifolia*, *Aegle marmelos* and *Balsamocitrus gabonensis* are immune to the disease and *Zanthoxylum rhetsa* and *Triphasia trifolia* seem to be immune. *Chalcas exotica*, *Ata-*

lantia disticha and *Fortunella japonica* are strongly resistant.—*Fortunella hindsii* on the summits of mountains (1500 feet elevation) in South China was found with abundant cankers. It is thought that this species may have been an original wild host from which the disease spread to cultivated species.—*D. Reddick.*

775. Levine, M. N., and E. C. Stakman. **A third biologic form of Puccinia graminis on wheat.** Jour. Agric. Res. 13: 651–654. 1918.—A strain of *P. graminis* was found in Oklahoma which readily infects the six differential hosts employed in the separation of the forms *tritici* and *tritici-compacti*. It is not named. [See Bot. Abst. 1, Entry 422.]—*D. Reddick.*

776. Linsbauer, L. **Richtlinien des Pflanzenschutzes im Gemüsebau. [Directions for plant protection in the vegetable garden.]** Österr. Gartenzeitg. 13: 41–48. 1918.—Directions for disinfecting seeds, sterilizing soil and general sanitary precautions to be observed. [From abstr. by Matouschek in Zeitschr. Pflanzenkr. 28: 337–338. 1918.]—*D. Reddick.*

777. Magnus, Werner. **Wund-Callus und Bakterien-Tumore. [Wound callus and bacterial tumors.]** Ber. Deut. Bot. Ges. 36: 20–29. 1918.—This paper deals only with German researches on crown gall (1915–1918). The author has discovered that it is sometimes difficult to distinguish between crown gall and callous formation. He has also discovered that when a crown gall develops abundantly it interferes more or less with normal growth (callous-growth in his experiments). He thinks that crown gall develops only in wounds and thus affords important analogies with animal cancer.—For his experiments the author used slices of carrots in petri dishes inoculating with *Bacterium tumefaciens* received from Kral's laboratory. Here he found that inoculations with *B. tumefaciens* on the cut surface often led to tumors which interfered with the development of the callus on the opposite surface although in the checks that was the part which naturally developed callus. The paper apologizes to the extent of two pages for the various mistakes of the German investigators of crown gall, Friedemann and Magnus, Blumenthal and Hirschfeld. The original may be consulted for details.—The most interesting thing is the concluding paragraph and the literature citations, which show that the *Zeitschrift für Krebsforschung*, which in 1912 remarked in a review, that crown gall had nothing in common with cancer except its name (Krebs), is now receiving publications from German medical men on this subject, as is also the *Zeitschrift für Hygiene und Infektionskrankheiten*. Furthermore, the disease has now been made a subject of study in the Berlin University Institute for cancer investigations. [See Bot. Absts. 2, Entry 610.]—*Erwin F. Smith.*

778. Massey, L. M. **More about rose diseases.** Amer. Rose Ann. 1918: 64–71. *Pl. 4.* 1919.

779. Nowell, William. **The control of cacao canker in Java.** [Rev. of: Hall, C. J. J. De destrijding van den cacaokanker op de indermening "Kemiri." Meded. Lab. Plantenz. Batavia 30. 1917.] Jour. Agric. News Barbados 17: 78–79. 1918.

780. Pole Evans, I. B. **Teff rust.** Kew Bull. Misc. Inf. 1918: 228–229. 1918.—*Uromyces pedicellata* n. sp. occurs on *Eragrostis abyssinica* in South Africa and crops grown late in the season are considerably damaged. The fungus occurs also on an indigenous species *E. curvula.*—*D. Reddick.*

781. Pole Evans, I. B. **Citrus canker in South Africa and its eradication.** S. African Jour. Indus. 1919: 1–24. *15 fig.* Jan., 1919.—Popular account of citrus canker, caused by *Bacterium tumefaciens*, including a short history of the disease in South Africa and a description of the eradication campaign inaugurated.—The total expenditure on citrus canker inspection, eradication and compensation for trees destroyed up to December 31, 1918 is £51,000.—Copies of the quarantine proclamations are included.—"In conclusion, it may safely be said that the spread of the disease has been definitely checked, and that the only thing which now endangers the eradication work is the supply of necessary funds."—*D. Reddick.*

782. Rankin, W. Howard. **Manual of tree diseases.** *20 × 14 cm., xx + 398 p., 70 fig.* MacMillan Co.: New York. 1918.—Diseases of the more common trees of the United States are treated. Discussions of these diseases are grouped into chapters under the common name of the tree affected, and the chapters are arranged alphabetically. In a general chapter are included discussions of the diseases common to all kinds of trees, such as damping off of seedlings, temperature injuries to leaves and woody parts, smoke and gas injuries, wood rots and the like. The species of trees affected, the geographic distribution, destructiveness and symptoms of the different diseases are presented in full. The causal agent of the diseases is briefly described, and when it is a parasite some details of life history are given with suggestions as to control.—One chapter is devoted to tree surgery —In the appendix are given common names and scientific names, a glossary of technical terms employed and a bibliography of pertinent literature.—*D. Reddick.*

783. Robbins, W. W., H. E. Vasey, and G. E. Egginton. **Cleaned, treated and tested seed for Colorado.** Colorado Agric. Exp. Sta. Bull. 238. *40 p., 11 fig.* 1918.—Part III (p. 20–32) is entitled "Methods of seed treatment for the prevention of diseases in certain farm crops."—*D. Reddick.*

784. Sawada, Kaneyoshi. [Japanese.] **[A new rust fungus parasitic on the rose.]** Trans. Sapporo Nat. Hist. Soc. 7: 36–40. 1918.—English description of *Kuehneola rosae* n. sp. [See Bot. Absts. 2, Entry 110.]

785. Schoevers, T. A. C. **Meer staatsbemoeiïng op het speciale gebied van bestrijding van plantenziekten en schadelijke dieren. [More information on the special subject of controlling plant diseases and destructive animals.]** Cultura 30: 164–171. 1918.

786. Spooner, C. S. **Pecan scab (Fusicladium effusum).** Georgia State Bd. Ent. Bull. 49: 38–48. *Pl. 14–15.* 1918.—Scab is the most serious disease of the pecan (*Carya*) in Georgia. —A list of susceptible and resistant varieties is given but there seems to be great variation depending on locality.—Experiments indicate that the disease may be held in check by the use of bordeaux mixture, 3 : 3 : 50. The number and time of treatments depend on weather conditions. A treatment should be made as soon as the nuts are formed and in very rainy seasons additional treatments are required at intervals of two weeks.—*D. Reddick.*

787. Stahel, Gerold. **De sclerotium-ziekte van de Liberia-koffie in Suriname. [The sclerotium disease of Liberian coffee in Suriname.]** Meded. Dept. Landbouw Suriname 13. *2 p.* 1918.—The disease was previously described from Suriname as the Coremium disease. Dark brown spots with distinct concentric rings are produced on the full-grown leaves. On the under side of the leaf coinciding with the darker rings are found numerous white fungous bristles, 2 to 4 mm. long. They bear no spores and are not coremia. They break off and are blown about by the wind and cause new infections. They also develop on diseased fruit which shows the same concentric marking. In damp situations small greenish brown or orange brown sclerotia are formed on the leaves and berries while still on the trees. A spore-bearing form could not be found. The mycelium has clamp connections. Disease can be controlled with Bordeaux mixture.—*C. robusta*, *C. uganda* and *C. arabica* are resistant while *C. abeocuta* and *C. excelsa* are susceptible.—*J. B. Rorer.*

788. Stahl, C. F., and Eubanks Carsner. **Obtaining beet leafhoppers nonvirulent as to curly-top.** Jour. Agric. Res. 14: 393–394. 1918.—Young nymphs of *Eutettix tenella* in emerging from the egg force their way, anterior end first, through the tissue of the petioles and midribs in which the eggs are deposited. It is possible to brush off the emerging nymphs before they have had a chance to feed and tests show that such nymphs are not carriers of the virus of the curly-top disease of sugarbeet (*Beta vulgaris*).—*D. Reddick.*

789. Stakeman, E. C., F. J. Piemeisel, and M. N. Levine. **Plasticity of biologic forms of Puccinia graminis.** Jour. Agric. Res. 15: 221–249. *Pl. 17–18.* 1918.—As a preliminary to

culture work it is necessary to isolate biologic forms from mixtures. How difficult this may be is illustrated in tables. If it is not done there is danger of erroneously concluding that bridging may have occurred.—Tests for four consecutive seasons with the forms *tritici*, *tritici-compacti*, *avenae* and *secalis*, show that biologic forms are neither broken down nor invigorated by passing through the barberry.—*Puccinia graminis secalis*, which does not attack wheat, but which does infect barley readily was cultured on barley and other theoretical bridging hosts continuously for three years during which time more than 2,000 wheat plants were inoculated. The rust acquired no new parasitic capability on account of its association with barley. Similar tests with other forms lead to the conclusion that "no one so-called bridging host nor any combination of such hosts enabled any biologic form tried to infect naturally immune plants nor to infect a highly resistant plant more readily."—Many attempts to increase the virulence of biologic forms on resistant hosts by successive transfers to these hosts indicate that rust forms do not gradually adapt themselves to resistant or semicongenial hosts, i.e., biologic forms appear to be roughly analogous to pure lines. Possibly *P. graminis avenae* is a mixture from which pure lines can be isolated.—Perceptible evolutionary changes have not been produced experimentally and no mutations have been observed. Practically this constancy of biologic forms is of importance in that breeding for rust resistance can proceed with considerable assurance that the same rust will not adapt itself quickly to new varieties.—*D. Reddick.*

790. Swingle, D. B., and H. E. Morris. **Plum pocket and leaf gall on Americana plums.** Montana Agric. Exp. Sta. Bull. 123: 167–188. *6 fig.* 1918.—Plum pocket caused by *Taphrina communis*, and leaf gall, caused by *Eriophyes pruni*, are described and illustrated. Their presence on the native wild plum (*P. americana*), the only species grown commercially in the State, has made plum growing unprofitable.—Leaf curl, caused by *Taphrina decipiens*, occurs in the State but is not destructive.—The former troubles may be controlled by a single application of lime-sulfur solution (1:50) made just before the fruit buds open. Leaf curl can not be controlled in this way.—*D. Reddick.*

791. Taubenhaus, J. J. **Diseases of truck crops and their control.** *20 × 14 cm. xxxi + 396 p.*, E. P. Dutton & Co.: New York, 1918.

792. Uzel, H. **Bericht über Krankheiten und Feinde der Zuckerrübe in Böhmen und der mit derselben abwechseind kultivierten Pflanzen im Jahre 1916. [Diseases and enemies of sugar-beet in Bohemia and the cultivated plants rotated with it.]** Zeitschr. Zuckerindust. Böhmen 42: 228–233. 1918.—Beet nematode, dry root rot of young plants and "dauerwurzelbrand" were present. Dry root rot is controlled by the use of 4 per cent raw perocid solution, treating for 6.5 hours. Heart rot often healed leaving only a hole in the top. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339. 1918.]—*D. Reddick.*

793. Uzel, H. **Über die Beurteilung des Rübensamens vom phytopathologischen Standpunkte aus. [On the judging of beet seeds from the pathological standpoint.]** Zeitschr. Zuckerindust. Böhmen 42: 364–370. 1918.—On the small leaves about the seed balls of beet mother plants the following were found: *Sporidesmium putrefaciens, Phoma betae, Cercospora beticola, and Cladosporium herbarum.* Seed disinfection is advised only for seed from diseased crops. Four per cent solution of perocid is the best disinfectant. [From abst. by O. von Kirchner in Zeitschr. Pflanenkr. 28: 339–340. 1918.]—*D. Reddick.*

794. Uzel, H. **Über Krankheiten und Schädiger der Samenrübe in Böhmen in den Jahren 1916 und 1917. [Diseases and enemies of seed beet in Bohemia in 1916 and 1917.]** Zeitschr. Zuckerindust. Böhmen 42: 423–430. 1918.—Much damage done by field mice. Seed heads were shattered by birds looking for insects.—A rot of the tap root, a chronic root disease and heart rot were present. [From abst. by O. von Kirchner in Zeitschr. Pflanzenkr. 28: 339. 1918.]—*D. Reddick.*

795. Van der Bijl, Paul A. **A cane leaf spot.** S. African Dept. Agric. Sci. Bull. 10: 1-15. *6 fig.* 1918.—The disease is very similar in appearance to the eye-spot disease of Hawaii. Circular to oblong light-colored spots usually delimited by a dark brown ring appear on the leaf blades and midribs.—A fungus was isolated and inoculations on pieces of leaves in moist chambers resulted in typical lesions. The organism is closely related to if not identical with *Cercospora sacchari.*—The fungus grows well on various media producing spores of variable length (17.5 to 112 μ) and septation (3 to 12).—Any cell of a spore may germinate in water within an hour. Spores withstand desiccation at room temperatures as long as 32 days but not 49 days; they germinate at temperatures 11.6 to 37° whether placed directly in water or are first air dried for 17 hours.—*D. Reddick.*

796. Van der Bijl, Paul A. **Ring spot of cane leaves.** S. African Dept. Agric. Sci. Bull. 10: 15-16. *Fig. 7.* 1918.—See Bot. Absts. 3, Entry 377.

797. Wakefield, E. M. **A disease of the yam. (Bagnisiopsis dioscoreae.)** Kew Bull. Misc. Inform. 1918: 199-201. *Illust.* 1918.—*Bagnisiopsis dioscoreae* on *Dioscorea prehensilis* from Nigeria is described as new. The fungus occurs on the branches and is "undoubtedly parasitic." The length of nodes and size of leaves on affected branches is reduced. There is no adventitious growth "although the swelling of the attacked haulms, together with the tiny rather chlorotic leaves, produces the appearance of a witches' broom." The yam vines attacked, are on poor or swampy places.—*D. Reddick.*

798. Weston, Jr. Wm. H. **Report on the plant disease situation in Guam.** Rept. Guam Agric. Exp. Sta. 1917: 45-62. 1918.—List of diseases of economic plants found on the Island in March, 1918.—Conditions in Guam which favor the development of diseases are: moist, tropical climate; primitive agricultural practices; unregulated importations of plants.—*D. Reddick.*

799. Wolk, P. C. **Het nieuwe gezichtspunt de serehziekte. [New viewpoint on "sereh."]** Cultura 30: 302-306. 1918.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

800. Anonymous. **Mexico's little-known botanicals.** Drug and Chem. Markets 5: 21. 1919.—General reference is made to the wealth in Mexico of natural products, little known outside the country. Specifically mentioned and very briefly discussed are the following; Cachuananche (Licania arborea Seeme), yielding abundant seeds with over 60 per cent of fixed oil valuable in the manufacture of artificial rubber. Chia (Salvia polstachya) said to produce a drying oil used in industries. Mamey (Lucuma mammosa); the oil in the seeds or the seeds themselves are used as cosmetics. Mosquitales; the tree yields a gum similar to gum arabic and the leaves are used in an eye remedy. Panete (Plumbago pulchella) yielding a caustic substance similar in effect to iodine (plumbagin is probably referred to—Ref.) Tabaquillo Oloroso (Hedeoma piperita) yielding an abundant mint like ethereal oil with 50 per cent menthol. La Raiz del Ozo Bear root, Valerian of Mexico considered a satisfactory substitute for the European drug. Azafrancillo (Carthamus tinctoria) used as saffron substitute in cooking. Chavacano (Prunus armeniaca) used for flavoring and Aguacate (Persea gratissima) growing wild but not as yet utilized, are also included in the list. The place of growth is usually given.—*Arno Viehoever.*

801. Huerre, R. **Sur la distillation sèche du bois de Juniperus Oxycedrus et de quelques coniferes. [On dry distillation of wood of Juniper, etc.]** Jour. Pharm. Chim. VII, 19: 33, 65. 1919.—The author has continued his studies on the oils of *Juniperus Oxycedrus* (see Jour. Pharm. Chim. VII, 121. Nov. 1, 1915). In the present investigation he has undertaken to study the relationship between the volatile oil obtained from the unheated wood and the oil

of Cade derived on the destructive distillation of wood. For convenience, he designates the oil of Cade "V" and the volatile oil "F."—Several conclusions are drawn from his experimental work. (1) Concerning the oil of Cade. Besides the differences in the fractions on distillation for determining the authenticity of the oil of Cade, the determination of the iodine number of Hübl and saponification figures furnish useful data on the adulteration of the oil. (2) Concerning the oils obtained from the cedar wood. It is evident that between the two oils V and F which have been studied comparatively after being prepared from wood of the same origin some rather distinct differences could be recognized, but except in the nature of the product derived by the evaporation of the ethereal solutions, one cannot determine any essential differences between the oils. Furthermore, the differences in the iodine number are not so apparent as the behavior of the two oils on fractionating. Although there is a distinct difference yet there is a striking resemblance between this oil and that naturally obtained on destructive distillation. This is interesting as it has some bearing on the origin and formation of the oils from the elementary hydrocarbons under the influence of metabolism in the plant. (3) Comparing the oil of Cade with the empyreumatic products derived from other Coniferae, he says: The color reactions on products obtained either by steam distillation or heating the empyreumatic oils do not show sensible differences from that of oils obtained from rather diverse sources. The fractional distillate and evaluation of the tarry residue do not enable one to differentiate the oils of Cade and the oils of Juniperus virginiana and Cedrus Libani. Distinct differences, however, were noted in the iodine number in oils of Cade and Cedrus Libani which had been previously treated with soda. On the contrary, the volatile oil (F) and the oil of Cade (V) are practically identical with that of the oil of Juniperus virginiana,—*H. Kraemer.*

802. Kauffman, C. H. The Agaricaceae of Michigan. Michigan Geol. Biol. Survey Pub. 26. (Biol. Ser. 5). 1918.—See Bot. Absts. 2, Entry 627.

803. Mirande. **[Hydrocyanic acid in ferns.]** Compt. Rend. Acad. Sci. Paris 167: 695. Nov. 4, 1918.—It is known that some plants containing hydrocyanic acid belong to the group of ferns; among others, *Pteris aquilina* Greshoff contains the glucoside amygdalin. Mirande proved the presence of a cyanogenetic glucoside (amygdalin) in the leaves of a fern rather common in the mountains of Savoy and Dauphiné, *Cystopteris alpina.* The leaves are macerated in water for several hours at a temperature of 25°–30°C. Subjected to steam distillation, the distillate contains hydrocyanic acid and benzoic aldehyde, the latter being detected by the formation of a hydrazone of this aldehyde under the action of acetic phenylhydrazine. The quantity of the glucoside, rather abundant at the beginning of the season, decreases little by little and reaches its minimum in September. The old leaves give a very faint odor of bitter almonds. This odor is also developed during dessication.—*H. Kraemer.*

804. Scoville, W. L. **Scammony and its substitutes.** Jour. Indust. Eng. Chem. 11: 335–336. 1919. Owing to the scarcity of jalap during the war, great interest was manifested in those drugs which would yield a similar active resin. [See Bot. Absts. 1, Entries 666, 669, 673.] This is a further study on this subject. A drug offered as *Resina drastica* and coming from Mexico, seemed in a general way to resemble *Ipomoea orizabensis,* but chemical examination showed it to be very different. The resin amounted to 19.2 per cent and the alcoholic extractive was 23.5 per cent. In general, this resembles both true and Mexican scammony resins. It is slightly more acid and is more strongly levorotatory. Its color alone would distinguish it, and treatment with decolorizing charcoal does not take out the color appreciably. When freshly precipitated it has an agreeable tea-like odor which disappears on drying. Probably a small amount of volatile oil is present in the drug. The powdered resin resembles scammony resin in odor. The special distinguishing features of the three resins are (1) the brownish color of true scammony resin, and the very deep green color which it gives with iron salts, (2) the light color of Mexican scammony resin, producing a colorless alcoholic solution, and giving almost no color with iron salts, and (3) the deep lemon-yellow color of the *Resina drastica* resin. The iron test distinguishes quite sharply between true and Mexican scammony

when a ferrous salt is used. If 0.5 g. of the resin be dissolved in 10 mils of alcohol and 0.5 mil of a 10 per cent. aqueous solution of ferrous sulfate is added, the Mexican scammony resin shows only a very faint green while the others become dark green and on standing deposit a dark mass, leaving an olive-green supernatant liquid.—*H. Kraemer.*

PHYSIOLOGY

B. M. Duggar, *Editor*

PROTOPLASM, MOTILITY

805. Harder ,Richard. **Über die Bewegung der Nostocaceen. [On the movement of the Nostocaceae.]** Zeitschr. Bot. 10: 177–244. 1918.—Only when poorly nourished with organic material are hormogonia active. A young hormogonium at first creeps, without rolling, in and out of the enveloping wall, later emerging in the direction of its long axis. After this, reversal usually occurs only under stimulation (mechanical obstruction or sudden change to darkness), which first produces a resting period of 1–2 minutes. Cells of a given hormogonium are independent in the secretion of mucilage (whose swelling the author thinks produces movement), in direction of movement, in time of reaction, and in perception of stimuli. This independent activity may break the hormogonia. The rate of movement varies with temperature, individuality, age, and light intensity. Tables and graphs show the magnitudes of these influences. The author presents a colloidal-swelling hypothesis to account for mechanics of movement and its direction. The mechanism of reversal is unknown.—*H. E. Pulling.*

806. Vonwiller, Paul. **Über den Bau des Plasmas der niedersten Tiere. [On the structure of the plasma of the lower organisms.]** Arch. Protistenk. 38: 279–323. 1918.—The article is devoted to cytological evidence on protoplasmic inclusions, vacuoles, crystals, sphaeroplasts, etc., and on the nature of the plasma membrane of rhizopods and myxomycetes, with special reference to the use and chemistry of vital stains.—*Wm. Seifriz.*

DIFFUSION, PERMEABILITY

807. Osterhout, W. J. V. **A comparative study on permeability in plants.** Jour. Gen. Physiol. 1: 299–304. 1918.—Quantitative studies on *Laminaria* (a brown alga), *Ulva* (a green alga), *Rhodomenia* (a red alga), and *Zostera* (a flowering plant) show that the behavior of these plants in respect to changes in permeability are essentially alike in all cases.—*Henry Schmitz.*

WATER RELATIONS

808. Pengelly, Margaret. **Demonstration of methods for the study of stomatal action.** Rept. Michigan Acad. Sci. 20: 154. 1918.—The three methods shown and compared were (1) Darwin's porometer (Darwin and Pertz), (2) the hygrometric paper method (Livingston and Shreve), and (3) direct examination with the microscope (F. E. Lloyd). Since method 2 is indicative of transpiration activity, and as stomatal activity does not necessarily run parallel, it is not considered as valuable as either methods 1 or 3. Method 3 is used as a check on method 2.—*R. P. Hibbard.*

MINERAL NUTRIENTS

809. Appel, M. **Über den Wert der von der Croneschen Nährlösung. [On the value of Crone's nutrient solution.]** Zeitschr. Bot. 10: 145–158. 1918.—Appel experimented with maize and buckwheat plants, growing them in Crone's and Pfeffer's nutrient solutions. He tested two forms of Crone's solution, one with tri-calcium phosphate and the other without it. The plants were harvested at the time of flowering and the length of the roots and shoots and that of the longest leaf were measured and dry weight was determined. Crone's solution

remained neutral during the growth period, or became slightly alkaline, and its content of ferrous salt remained almost unchanged. Pfeffer's solution was acid at the beginning of the experiment, but during the development of the plants a precipitate was formed and the solution became neutral. The amount of ferric salt in Pfeffer's solution (originally rather large) decreased and finally became nil during the growth of the plants. It was further found that plants that are but slightly sensitive to acid, such as buckwheat, thrive as well in Pfeffer's as in Crone's solution. Iron-loving plants that are at the same time sensitive to acid, such as maize, develop better in Crone's solution.—*Raf. B. Espino.*

810. BUCKNER, G. DAVIS. **The translocation of the mineral constituents of tho Jack bean.** Jour. Amer. Chem. Soc. 41: 282–287. 1919.

811. HIBBARD, R. P. **Salt ratios in soil cultures.** Rept. Michigan Acad. Sci. 20: 147–150. 1918.—When 3 salts KH_2PO_4, $MgSO_4$, and $Ca(NO_3)_2$ are combined in all possible ratios each varying from the other by 10 per cent increments there are 36 possible ratios. By means of auto-irrigation 36 pots of soil were maintained at optimum water content, and each was supplied with a definite ratio of the 3 salts. The soil was thus treated to determine if possible a best or optimum ratio of salts for that particular soil. In previous studies it had been possible to determine an optimum ratio in both the soil solution and distilled water cultures. The optimum ratio for wheat in a sandy loam was 4–4–3. That for a poor sandy soil, also for wheat, was 5–4–1. This study suggests a possible laboratory method for determining the fertilizer needs of a soil in a quick, reliable, scientific manner, rather than depending on long time experiments and empirical methods.—*R. P. Hibbard.*

812. DAVIDSON, J., AND J. A. LECLERC. **The effect of sodium nitrate applied at different stages of growth on yield, composition and quality of wheat. 2.** Jour. Amer. Soc. Agron. 10: 193–198. 1918.—A continuation of previous studies which includes chemical analysis of the plants. No conclusive results were obtained on the effect of $NaNO_3$ on the ash, phosphoric acid, or potash content of the grain. Nitrate applied at the second stage of the plant growth increased the protein content of both grain and straw, while potassium chloride depressed the protein content of straw.—*H. S. Reed.*

813. DICKSON, JAMES G. **The value of certain nutritive elements in the development of the oat plant.** Amer. Jour. Bot. 5: 301–324. *Fig. 1–5.* 1918.—Using Knop's standard nutrient solution, slightly modified, the author studies the effect of certain nutritive elements on growth, total dry weight, grain production, and water requirement. A deficiency in phosphorus, nitrogen, magnesium, calcium, or potassium affects each phase studied; however, the effects upon the plants of limiting the supply of phosphorus or nitrogen are much more severe and noticeable than the effects of limiting the supply of magnesium, calcium, or potassium.—*R. W. Webb.*

814. GURLITT, LUDWIGA. **Über der Einfluss der Koncentration der Nährlösung auf einige Pflanze. [The influence of nutrient salt concentration on certain plants.]** Beih. Bot. Centralbl. 35: 279–341. 1918.—1. The effect of concentrations of Knop's solution, from 0.1 to 4 per cent, on the form of moss protonema was observed. *Funaria* protonema growing in the lower concentrations had long thin cells, little chlorophyll, and rich growth of rhizoids. Protonema growing in the higher concentrations had spherical cells. The chlorophyll content increased with the concentration. In 0.1 per cent solutions and upward there were no rhizoids.—2. *Chenopodium rubrum, C. album, Tradescantia fluminalis, T. Zebrina, Rumex alpinus,* and other plants were grown in Knop's solution of different concentrations up to 4 per cent. It was found that the osmotic pressure of the plant cells increased with increased pressure of the solutions. The osmotic pressure of the leaves was determined plasmolytically in cells over the midvein. Tradescantia leaves showed a constant difference of about 5 atmospheres between cell pressure and solution pressure. The pressure of *Rumex* leaves increased from 17 atmospheres (grown in water) to 37 atmospheres (in 4 per cent Knop's), —a difference between cell pressures and solution pressure of from 17 to 23 atmospheres.

Chenopodium leaves showed a greatly increased osmotic pressure in the higher concentrations of Knop's solution: in water 13 atmospheres, 0.5 per cent Knop's 18 atmospheres, 1 per cent solution 29 atmospheres, 1.5 per cent solution 33 atmospheres, 2 per cent solution 41 atmospheres, 2.5 per cent solution 43 atmospheres, 3 per cent solution 58 atmospheres, 4 per cent solution 64 atmospheres.—The osmotic pressure of the roots also increased with increased pressure of the solutions in which they were growing. It was always somewhat lower than the pressure of the leaves.—It was thought that the increased pressure was due in part to an accumulation of sugar in the cells because of slow growth in the higher concentrations. —*Sophia Eckerson.*

815. NORTHRUP, ZAE. **The effect of concentrated solutions of certain magnesium salts on pyogenic and other bacteria.** Jour. Infect. Diseases 24: 170–175. 1919.—A saturated solution of $MgSO_4$ has no effect on *Stapholococcus aureus;* any concentration of $MgSO_4$ (5 per cent and more) will inhibit growth of *Streptococcus pyogenus;* a concentration of 30–45 per cent of $MgSO_4$ was required to prevent the growth of *Bacterium coli.* $MgCl_2$ had the most marked inhibitory action on the growth of all organisms used in the experiment. The Mg-ion itself is probably responsible for this action.—*Selman A. Waksman*

816. SHIVE, J. W., AND MARTIN, W. H. **A comparative study of salt requirements by young and mature buckwheat plants in solution cultures.** Jour. Agr. Res. 14: 151–175. 1918. —Young and mature buckwheat plants were grown on optimum three salt solutions. The salts, potassium phosphate, calcium nitrate, and magnesium sulfate were so distributed as to include all possible sets of proportions of the three salts when the partial concentrations of the three components were made to vary by equal increments of one tenth of the total osmotic concentration. Each solution contained a trace of iron as iron sulfate. The yield of roots and tops in the different solutions are given. No definite correlation between the yield of tops and of seeds, such as there is between the yield of tops and of roots, was found.—*Henry Schmitz.*

817. TOTTINGHAM, W. E. **A preliminary study of the influence of chlorides on the growth of certain agricultural plants.** Jour. Amer. Soc. Agron. 1: 1–33. 1918.—In many cases the plants responded to the influence of chlorides by an increase in the amounts of tops, leaves, and roots. Proceeding from the observed effects of chlorides upon diastase and other enzymes which act upon carbohydrates, a tentative hypothesis is advanced to explain the varied physiological responses of plants to chlorides through the regulation of enzyme activity by these salts.—*Henry Schmitz.*

PHOTOSYNTHESIS

818. OSTERHOUT, W. J. V., AND A. R. C. HAAS. **On the dynamics of photosynthesis.** Jour. Gen. Physiol. 1: 1–16. 1918.—Minute amounts of photosynthesis in marine plants can be accurately measured by adding a little phenolphthalein to sea water and observing the change in color of the indicator. In the case of fresh water aquatics bicarbonates are added. By this method it is found that *Ulva,* which has been kept in the dark, begins photosynthesis as soon as it is exposed to sunlight and that the rate steadily increases until a constant speed is attained. This fact is explained by assuming that sunlight decomposes a substance whose products either catalyze photosynthesis or enter directly into the reaction.—*Henry Schmitz.*

METABOLISM (GENERAL)

819. COHN, E. J., S. B. WOLBACH, L. J. HENDERSON, AND P. H. CATHCART. **On the control of rope in bread.** Jour. Gen. Physiol. 1: 221–230. 1918.—A bacillus belonging to the *Bacillus mesentericus* group is found to be the possible causative organism. It is believed that by maintaining a hydrogen-ion concentration of near 10^{-5} in the bread the reaction would be sufficiently acid to prevent the development of rope.—*Henry Schmitz.*

820. FELLENBERG, TH. VON **Über den Nachweis und die Bestimmung des Methylalkohols, sein Vorkommen in den verschiedenen Nahrungsmitteln und das Verhalten der methylalkoholhaltigen Nahrungsmittel im Organismus. [The presence and method of determination of methyl alcohol, and its origin in foods.]** Biochem. Zeitschr. 85: 45–117. 1918.—Traces of methyl alcohol are found in many fruits, seeds, and plant tissues. The large amounts occurring in various fermented liquors is attributed to the decomposition of pectic substances.—*Henry Schmitz.*

821. KAPPEN, H. **Untersuchungen über Wurzelsäften. [Investigations on root sap.]** Landw. Versuchsst. 91: 1–40. 1918.—Expressed root saps were studied using (1) wheat, (3) barley, (4) oats, (5) rye, (2) dwarf bean, (7) horse bean, (8) lupine, (6) mustard, (9) buckwheat. These names are arranged in order of increasing acidity determined by titration, and numbered in order of increasing H-ion concentration. Nos. 4, 5 and 2 are alike by titration. Since H-ion concentration is very low for a molecular concentration of acid, the author concludes that the sap contains a mixture of free organic acids and their salts with strong bases (as in animals), these salts reducing acid dissociation. He questions the value of soil digestion with weak acids, as 1–2 per cent citric acid—supposed to be equivalent in dissolving power (H-ion concentration) to average roots—since 1 per cent citric acid solution has "titration-acidity" 6 times, and H-ion concentration 1500 times that of buckwheat root sap, the most acid sap found. Also, reduced dissociation of weak acids by neutral salts formed during digestion of soils, Thomas meal, etc., leads to erroneous comparative conclusions. The author thinks the characteristic acidity of a given plant is optimal for the action of its enzymes, as is known in the case of animals, so that lime-sensitive plants (really sensitive to all strong bases) are so because of reduced dissociation of acids in the sap through the action of neutral salts of strong bases. The greater the initial H-ion concentration of the sap the greater the reduction, so that the most acid plants are the most sensitive to alkalinity.—*H. E. Pulling.*

822. KYLIN, H. **Zur Kenntniss der wasserlöslichen Kohlenhydrate der Laubblätter. [The water-soluble carbohydrates of foliage leaves.]** Zeitschr. Physiol. Chem. 101: 77–88. 1918.—The amounts of soluble monosaccharides, disaccharides and polysaccharides occurring in various leaves are given.—*Henry Schmitz.*

823. KYLIN, H. **Weitere Beiträge zur Biochemie der Meeresalgen. [Biochemistry of marine algae.]** Zeitschr. Physiol. Chem. 101: 236–247. 1918.—Mannite is present in most of the brown but absent in the red and green algae. Laminarin, a complex laevo-rotary sugar which upon hydrolysis is quantitatively converted into dextrose, is isolated from the brown algae.—*Henry Schmitz.*

824. RIGG, GEORGE B. **Some energy relations of plants.** Science 48: 125–132. 1918.

825. SMALL, JAMES CRAIG. **Quantitative determination of soluble starch in the presence of starch and its hydrolytic cleavage products.** Jour. Amer. Chem. Soc. 41: 107–112. 1919.

826. SMALL, JAMES CRAIG. **A method for the preparation of soluble starch.** Jour. Amer. Chem. Soc. 41: 113–120. 1919.

827. VOEGTLIN, CARL, AND C. N. MYERS. **Phosphorous as an indicator of the "vitamine" content of corn and wheat products.** U. S. Public Health Rept. 33: 49–54. 1918.

828. VOEGTLIN, CARL, G. C. LAKE, AND C. N. MYERS. **The dietary deficiency of cereal foods with reference to their content in "antineuritic vitamine."** U. S. Public Health Rept. 33: 647–666. 1918.

829. VOEGTLIN, CARL, AND C. N. MYERS. **The growth-promoting properties of foods derived from corn and wheat.** U. S. Public Health Rept. 33: 843–868. 1918.

830. ZELLNER, J. **Chemische Untersuchungen über Pflanzengallen. II. [Chemical investigations of plant galls.]** Zeitschr. Physiol. Chem. 101: 255–261. 1918.—Considerable chemical differences are found between normal and gall tissue.—*Henry Schmitz.*

METABOLISM (NITROGEN RELATIONS)

831. HESSELMAN, HENRICK. **Studier över saltpeterbildningen i naturliga jordmåner och dess betydelse i växtekologiskt åvseende. [Nitrate production in forest soils.]** Meddel. Statens Skogförsöksanst. 13-14: 297–528. 1916–17. [Received, 1918.]—Nitrification in many forest soils is as rapid as in cultivated fields. Many forest trees make greater growth in soils where nitrification is taking place than in soils where it does not. In soils in which nitrates are not found certain pines still make good growth and it is suggested that this may be due to the fact that they are able to absorb and utilize the ammonia found present in the humus.—*Henry Schmitz.*

METABOLISM (ENZYMES ACTION, FERMENTATION)

832. CRUESS, W. V. **The fermentation organisms of California grapes.** Univ. California Publ., Agric. Sci. 4: 1–66. *Pl. 1–2.* 1918.—A qualitative and quantitative study of the fermentation organisms occurring on California grapes.—*Henry Schmitz.*

833. EULER, HANS. **Über die Darstellung von Kohlenhydratphosphorsäurester (Zymophosphat) durch lebende Hefe. [The formation of zymophosphate by living yeasts.]** Biochem. Zeitschr. 86: 337–342. 1918.—Two groups of yeast are recognized with respect to their power to quantitatively convert inorganic phosphorous to zymophosphates. One of these groups has this power only when in the active living state, while the other still retains it in the presence of toluol.—*Henry Schmitz.*

834. HARVEY, E. N. **Studies on bioluminescence. VII. Reversibility of the photogenetic reaction in Cypridina.** Jour. Gen. Physiol. 1: 133–145. 1918.—At least three substances are concerned in light production: (1) luciferin, a body oxidizing with the production of light, dializable, and relatively resistant to heat, (2) luciferase, destroyed by boiling, non-dializable, and accelerating the oxidation of luciferin, and (3) photophelein probably acting by assisting the luciferin-luciferase reaction.—*Henry Schmitz.*

835. HARVEY, E. N. **Studies on bioluminescence. IX. Chemical nature of Cypridina luciferin and Cypridina luciferase.** Jour. Gen. Physiol. 1: 269–295. 1918.—Luciferin presents many characteristics in common with proteins but doubt of its protein nature is indicated by its peculiar solubilities and its resistance to digestion by proteases. Luciferase is considered an oxidizing enzyme in a class by itself—a group having the general chemical reactions of albumins.—*Henry Schmitz.*

836. JACOBY, M. **Über Fermentbildung. [Enzyme formation.]** Biochem. Zeitschr. 86: 329–336. 1918.—Urease is formed by *Bacillus coli* when leucine is furnished the organism. The general conclusion is reached that the various substances concerned in the synthesis of proteins are also concerned in the formation of enzymes. [See Bot. Absts. 2, Entry 592.] —*Henry Schmitz.*

837. LEBERT, M. **Action des sels neutres sur l'inversion due sucre par les acides. [The effect of neutral salts on the inversion of sugar by acids.]** Rév. Gén. Bot. 30: 241–244. 1918.

838. MYERS, VICTOR C., AND ANNE G. DELLENBAUGH. **Studies on the amylolytic activity of human saliva with a new method.** Proc. Soc. Exp. Biol. Med. 16: 18–20. 1918.

839. WAKSMAN, S. A. **Studies on the proteolytic activities of soil microorganisms with special reference to fungi.** Jour. Bact. 5: 475–492. 1918.—The organisms were grown on Czapek's solution, and Czapek's solution in which peptone or casein was substituted for

sodium nitrate, and the relative amounts of ammonia and amino nitrogen present in the filtrate determined. A small amount of amino nitrogen and considerable ammonia accumulates in rapidly growing cultures of molds, while in slow growing cultures there is a comparatively large accumulation of amino nitrogen and little ammonia. The presence of available carbohydrates checks the accumulation of ammonia in the medium.—*Henry Schmitz.*

METABOLISM (RESPIRATION)

840. BROOKS, MATILDA M. **Comparative studies in respiration. III. The effect of ether on the growth and respiration of Bacillus subtilis.** Jour. Gen. Physiol. 1: 193–201. 1918.—In all of the concentrations of ether studied (from 0.037 to 7.3 per cent) there is an increase in the rate of respiration of *Bacillus subtilis* followed by a decrease. In 7.3 per cent ether in tap water there is an extraordinary increase in the output of carbon dioxide (amounting to fifty times the normal). This does not occur when 0.85 per cent sodium chloride is added, which indicates antagonism between the ether and the sodium chloride. Ether is found toxic in low and high concentrations but in the intermediate concentrations (1.1 to 3.65 per cent) there is a stimulation of growth.—*Henry Schmitz.*

841. GUSTAFSON, F. G. **Comparative studies on respiration. II. The effect of anesthetics and other substances on the respiration of Aspergillus niger.** Jour. Gen. Physiol. 1: 181–191. 1918.—The effects of anesthetics and other substances on the respiration of *Aspergillus niger* and *Penicillium* are studied. In concentrations which are high enough to produce any effect, formaldehyde, ether, and acetone cause an increase followed by a decrease in respiration.—*Henry Schmitz.*

842. IRWIN, MARIAN. **Comparative studies on respiration. V. The effect of ether on the production of carbon dioxide by animals.** Jour. Gen. Physiol 1: 209–220. 1918.—In general ether causes a decrease in the production of carbon dioxide by animals followed by an increase. The difference between plants and animals is found in that with the latter the increase in carbon dioxide output is accompanied by irreversible changes leading to death, while this is not necessarily the case in plants.—*Henry Schmitz.*

843. OSTERHOUT, W. J. V. **A method of studying respiration.** Jour. Gen. Physiol. 1: 17–22. 1918.—An apparatus is described which makes it possible to measure rapidly and accurately small amounts of carbon dioxide given off by organisms of all kinds. The apparatus can also be used to measure photosynthesis.—*Henry Schmitz.*

844. OSTERHOUT, W. J. V. **An indicator method of measuring the consumption of oxygen.** Jour. Gen. Physiol. 1: 167–171. 1918.—The use of the blood of the horse shoe crab (*Limulus*) which turns blue when oxygen is absorbed and becomes colorless when reduced is suggested as an indicator method of measuring the consumption of oxygen in certain organisms.—*Henry Schmitz.*

845. OSTERHOUT, W. J. V. **Comparative studies in respiration. I. Introduction.** Jour Gen. Phys. 1: 171–179. 1918.—A series of investigations with improved quantitative methods has been commenced. The results of the first of these show that when anesthetics are employed in sufficient concentration to produce any result, plants show a rise in respiration followed by a fall. In the animals studied the rise (found in the higher concentrations only) was preceded by a temporary fall which was not entirely due to lowering of muscular activity or tonus. In lower concentrations the effect upon animals was merely a decrease in respiration.—*Henry Schmitz.*

846. THOMAS, HELEN S. **Comparative studies in respiration. IV. The effect of ether on the respiration of wheat.** Jour. Gen. Physiol. 1: 203–207. 1918.—An increase of respiration followed by a decrease is produced by a concentration of from 7.3 to 3.65 per cent ether on wheat.—*Henry Schmitz.*

ORGANISM AS A WHOLE

847. FELLERS, C. L. **The effect of inoculation, fertilizer treatment and certain minerals on the yield, composition and nodule formation of soy beans.** Soil Science 6: 81–119. *Pl. 1–5.* 1918.—Experimental methods are given in detail and the results show that the composition and the nodule formation of soy beans may be influenced by all factors mentioned in the title.—*R. W. Webb.*

848. FELLERS, C. R. **Report on the examination of commercial cultures of legume—infesting bacteria.** Soil Science 6: 53–67. 1918.—The purity and vitality of many commercial cultures were found to be good. Soy beans were less successfully inoculated than most other legumes. Soil or muck cultures proved to be excellent carriers of soil bacteria.—*R. W. Webb.*

849. GILLESPIE, LOUIS J., AND LEWIS A. HURST. **Hydrogen-ion concentration—soil type—common potato scab.** Soil Science 6: 219–236. *Fig. 1–3.* 1918.—Using colorimetric and electrometric methods the hydrogen-ion concentration of many soils was determined with the result that excellent correlation is established between hydrogen-ion concentration and occurrence of potato scab. Exponents below 5.2 are related to little or no scab, while higher exponents are generally indicative of scab prevalence. [See Bot. Absts. 1, Entry 1617.]—*R. W. Webb.*

850. NEWCOMBE, F. C. **Behavior of plants in unventilated chambers.** Rept. Michigan Acad. 20: 145–146. 1918.—In this study covering a period of three years and the employment of more than 2000 plants, there appeared no constant appreciable differences in the rate of growth, the dropping of leaves, and the falling over of the plants when control plants were compared with plants growing in unventilated chambers. All experiments were carried on in the dark because of the impossibility of keeping constant temperature in the light. In regard to responses to geotropism and heliotropism in moving and stagnant air, no differences could be determined in the time of response or in the angle of curvature. The plants were generally seedlings of field corn, pop-corn, wheat, buckwheat, radish, white mustard, castor bean, pumpkin, garden pea, kidney bean, Windsor broad bean, white lupine and sweet pea. Plants were kept in the experimental condition usually for from four to ten days.—*H. P. Hibbard.*

851. NEWCOMBE, F. C., AND ETTA A. BOWERMAN. **Behavior of plants in unventilated chambers.** Amer. Jour. Bot. 5: 284–294. 1918.—Various plants growing in quiet and in moving air were studied, but observations and measurements showed very slight differences between the plants raised under the two conditions.—*R. W. Webb.*

852. NOYES, H. A., AND C. O. CROMER. **Tests of commercial cultures for legume inoculation.** Soil Science 6: 69–77. *Pl. 1.* 1918.—Soil and commercial cultures were equally efficient in inoculation, each giving 100 per cent. Increased quantities of soil do not increase the inoculations, whereas larger quantities of commercial cultures do. Fertilization with nitrate of soda tended to reduce the percentage of inoculations.—*R. W. Webb.*

853. PRINGSHEIM, ERNST G. **Zur Physiologie endophytischer Cyanophyceen.** [**The physiology of endophytic Cyanophyceae.**] Arch. Protistenk. 38: 127–130. 1918.—*Nostoc punctiforme* from *Cycas* and *Gunnera*, and also *Anabaena Azollae* from *Azolla*, can be made to reproduce outside of the host plant. They are capable of autotrophic nourishment in nutrient solutions such as are generally used for algae. Increased growth through consumption of organic substances was noticeable only in *Nostoc*, in which such consumption could, to a certain degree, replace carbon dioxide assimilation. Nitrogen fixation was not observed.—*Wm. Seifriz.*

854. YOUNG, R. T. **The relation of rhythms and endomixis, their periodicity and synchronism in Paramecium aurelia.** Biol. Bull. 35: 38–47. 1918.

GROWTH, DEVELOPMENT, REPRODUCTION

855. LEVIN, ISSAC, AND MICHAEL LEVINE. **Malignancy of the crown gall and its analogy to animal cancer.** Proc. Soc. Exp. Biol. Med. 16: 21–22. 1918.—See Bot. Absts. 2, Entry 106.

856. MELLSTRÖM, GÖSTA. **Skogsträdens frösättning år 1916.** [Seed production of forest trees.] Meddel. Statens Skogs-försöksanst. 13–14: 167–168. 1916–17. [Received 1918.]—The general conclusion is reached that after an adverse winter forest trees produce few flowers and still fewer seeds.—*Henry Schmitz.*

GERMINATION, RENEWAL OF ACTIVITY

857. BRYAN, W. E. **Hastening the germination of Bermuda grass seed by the sulfuric acid treatment.** Jour. Amer. Soc. Agron. 10: 279–281. 1918.—A method is described for obtaining promptly a higher percentage of seed germination. Seeds were immersed in strong sulfuric acid for periods of 5 to 60 minutes, washed, and transferred to moist blotting paper. The best results followed an acid treatment for 10 minutes.—*H. S. Reed.*

REGENERATION

858. LOEB, J. **The law controlling the quantity of regeneration in the stem of Bryophyllum calycinum.** Jour. Gen. Phys. 1: 81–96. 1918.—A method is given which allows the measurement of the influence of the mass of a leaf upon the quantity of shoots regenerated in an isolated piece of stem. The results indicate that the mass of shoots regenerated at the apex of such a piece of stem increases under equal conditions and equal time with the mass of the leaf and is approximately proportional to the mass of the leaf.—*Henry Schmitz.*

859. LOEB, J. **The physiological basis of morphological polarity in regeneration.** Jour. Gen Physiol. 1: 337–362. 1918.—1. The leaves of *Bryophyllum calycinum* exert an inhibitory influence on shoot formation. The inhibitory influence can be diminished or be made to disappear when the mass of leaf is reduced below a certain limit. The possibility that the inhibitory influence of the leaf upon shoot formation is due to inhibitory substances secreted by the leaf and carried by the sap from the leaf towards the base of the stem is suggested.—*Henry Schmitz.*

TEMPERATURE RELATIONS

860. BEHRE, ELLINOR H. **An experimental study of acclimation to temperature in Planaria dorotocephala.** Marine Biol. Bull. 35: 277–317. 1918.

861. BOVIE, W. T., AND ALICE KLEIN. **Sensitization to heat due to exposure to light of short wave lengths.** Jour. Gen. Physiol. 1: 331–336. 1918.—Paramecia which have been exposed to fluorite radiation are so highly sensitized to heat that they are unable to withstand even for sixty seconds, temperatures which are optimum for non-radiated plants.—*Henry Schmitz.*

862. HOSKINS, M. M. **Further experiments on the effect of heat on the eggs of Cumingia.** Marine Biol. Bull. 35: 260–276. *Pl. 1–2.* 1918.

863. KOTILA, J. E. **Frost injury of potato tubers.** Rept. Michigan Acad. Sci. 20: 451–459. 1918.—This is a statement of the various forms of frost injury and the great money loss sustained, and an account of the experimental production of various spottings and internal discolorations of tubers under control conditions.—*R. P. Hibbard.*

864. LAUGHLIN, H. H. **The dynamics of cell-division.** Proc. Soc. Exp. Biol. Med. 15: 117–122. 1918.—Study of dynamics of mitosis has lagged behind that of structural phases. Time relations of mitosis must be studied under different environments. A study is reported

the object of which was to determine the effect of increase in temperature of 10° above 10°C. and above 20°C. respectively on mitosis in onion root tips. The temperature coefficient, or Q_{10}, for the entire cell cycle in the two cases, respectively, is found to be +1.2139 and +2.6218. The increase from 10°C. to 20°C. thus only accelerates mitosis slightly, whereas an increase from 20°C. to 30°C. more than doubles the speed of cell division. The author lists 20 physical, chemical and physiological processes which increase in speed with rise in temperature between 5°C. and 35°C., 10 which decrease, and 6 which may do either according to conditions. He concludes that mitosis is not the sum total of continuous and independent physiological actions, but an interrelated system of vastly complex forces.—*C. H. Farr.*

865. Osterhout, W. J. V., and A. R. C. Haas. **The temperature coefficient of photosynthesis.** Jour. Gen. Physiol. 1: 295–298. 1918.—The temperature coefficient of photosynthesis in *Ulva* (between 17 and 27°C.) is 1.81. This may be explained by assuming that the process involves a light reaction with a low coefficient followed by an ordinary reaction with a high coefficient.—*Henry Schmitz.*

RADIANT ENERGY RELATIONS

866. Bovie, W. T., and D. M. Hughes. **Rate of recovery from the action of fluorite rays.** Jour. Gen. Physiol. 1: 323–329. 1918.—Some experiments on the rate of recovery of *Paramecium caudatum* from the cytolytic action of fluorite rays are reported.—*Henry Schmitz.*

867. Brooks, S. C. **Complement destruction as a measure of the effects of radiation.** Jour. Med. Res. N. S. 33: 345–351. 1918.—Attempting to secure indications regarding the initial changes produced in protoplasm by exposure to light the author employed a 2 per cent solution of guinea pig serum in .85 per cent sodium chloride, exposing the complement in a layer 11 mm. deep in a quartz tube 8.5 cm. from a mercury vapor arc. The complementing power was estimated by the hemolysis of sheep erythrocytes sensitized with several units of anti-sheep rabbit serum, and the grade of hemolysis ultimately measured colorimetrically. The results indicate a loss of complementing power, after radiating ten minutes, and no spontaneous recovery occurs.—*B. M. Duggar.*

868. Hecht, Selig. **The photic sensibility of Ciona intestinalis.** Jour. Gen. Physiol. 1: 147–166. 1918.—The results obtained with regularly repeated stimulation not only fail to show any basis for a "learning" process, or for the presence of a "higher behavior," but follow the requirements of a photochemical reaction.—*Henry Schmitz.*

TOXIC AGENTS

869. Brooks, S. C. **A theory of the mechanism of disinfection, hemolysis, and similar processes.** Jour. Gen. Physiol. 1: 61–80. 1918.—The various theories are discussed and found inadequate, and another is suggested. It is held that the course of processes like disinfection is the result of two factors; the frequency curve of variation in individual resistance, which may be different for each group of cells and each toxic agent; and the course of the fundamental reaction, which usually proceeds with a velocity diminishing during the experiment at a rate dependent on the particular conditions prevailing.—*Henry Schmitz.*

870. Cook, F. C., and J. B. Wilson. **Boron: Its effect on crops and its distribution in plants and soils in different parts of the United States.** Jour. Agric. Res. 13: 451–470. 1918.—Borax or colemanite mixed with horse manure had no effect on the growth or yield of wheat or barley. A decided difference is found in the capacity of soils to render boron nontoxic to plants.—*Henry Schmitz.*

871. Goodspeed, T. H., J. M. McGee, and R. W. Hodgson. **Note on the effects of illuminating gas and its constituents in causing abscission of flowers in Nicotiana and Citrus.** Univ. California Publ. Bot. 5: 439–450. 1918.—Illuminating gas causes premature abscission, though the response may vary according to variety or species. The constituents of the gas, carbon-monoxide, carbon dioxide, and ethylene, all exert the same effect.—*R. W. Webb.*

872. HARRIS, F. S., AND D. W. PITTMAN. **Soil factors affecting the toxicity of alkali.** Jour. Agric. Res. 13: 287–319. 1918.—The size of particles of sand, independent of other factors seems appreciably to influence the toxicity of alkali. Coarse loams, however, are more tolerant than the finer ones at the same moisture content. In general, soils with high water-holding capacity are more tolerant to alkali than those having a low water-holding capacity.—*Henry Schmitz.*

873. MACHT, D. I., AND D. E. NELSON. **On the antiseptic action of benzyl alcohol.** Proc. Soc. Exp. Biol. Med. 16: 25–26. 1918.

874. PACKARD, C. **Difference in the action of radium on green plants in the presence and absence of light.** Jour. Gen. Physiol. 1: 37–38. 1918.—The effect of radium in causing the disintegration of *Spirogyra* and *Volvox* cells is much more pronounced in the dark than when the plants are exposed to light.—*Henry Schmitz.*

875. PACKARD, CHARLES. **The effect of radium radiations on the development of Chaetopterus.** Marine Biol. Bull. 35: 50–70. *Pl. 1–2.* 1918.

876. STEINBERG, R. A. **A study of some factors influencing the stimulative action of zinc sulfate on the growth of Aspergillus niger. II. A comparison of two strains of the fungus.** Bull. Torrey Bot. Club. 46: 1–21. *Pl. 1.* 1919.—The discrepancies existing between the results reported by various investigators for the stimulative action of zinc sulphate on the growth of *Aspergillus niger* are two great to be laid to experimental errors. Two one-spore strains of this fungus were isolated, one showing no pigment and the other the maximum amount of yellow pigment in the hyphae; the former was called W, and the latter Y. The existence of quantitative difference in the growth of the two strains was marked from the first, both with and without zinc, and it was demonstrated that a higher concentration of zinc was necessary to obtain the maximum yield for the W strain than for the Y. Both strains showed in time a decrease in the effect of the action of suboptimal zinc concentrations. The progressive modification of the growth capacity was scarcely manifest in the higher zinc concentrations. The assumption was made that this gradual change in the strains was due to the "non-addition of organic salts to the peptone-sucrose agar used for the stock cultures." Transfers were made to an agar medium containing such salts and cultured for three generations, then used for inoculating bread cultures and these in turn for Pfeffer solution. No modification of the two strains was evident in so far as the yield obtained was concerned. Experiments with various media seemed to show that the assumption that the decrease in yield was due to the impoverishing of the spores in some essential ash constituent was improbable. Throughout, however, the maximum yield of about 1 gram per 50 cc. of medium was obtained when the proper amount of zinc was added. The fact that the decrease in yield was most conspicuous when little or no zinc was added suggested that the "zinc-free" media were not entirely so. It seems that the differences existing in the literature between the results recorded by different investigators can, in part at least, be attributed to the use of strains having different "zinc optima."—*P. A. Munz.*

MISCELLANEOUS

877. LOEB, JACQUES. **The influence of neutral salts upon the viscosity of gelatin solutions.** Jour. Biol. Chem. 34: 395–413. 1918.

878. LOEB, J. **Amphoteric colloids. I. Chemical influence of hydrogen ion concentration.** Jour. Gen. Physiol. 1: 39–60. 1918.—The experiments suggest that the theory of amphoteric colloids in its general features is identical with the theory of inorganic hydroxides whose behavior is adequately understood on the basis of the laws of general chemistry.—*Henry Schmitz.*

879. Loeb, J. **Amphoteric colloids. II. Volumetric analysis of ion-protein compounds; the significance of the isoelectric point for the purification of amphoteric colloids.** Jour. Gen. Physiol. 1: 237–254. 1918.—It is shown by volumetric analysis that on the alkaline side from the isoelectric point gelatine combines with cations only, that on the more acid side from its isoelectric point it combines with anions, but not with cations, and at the isoelectric point (P. h. 4.7.) it combines with neither anion nor cation. It is suggested that the simplest method of obtaining amphoteric colloids approximately free from inorganic impurities would seem to consist of bringing them to the hydrogen ion concentration characteristic of their isoelectric point.—*Henry Schmitz.*

880. Loeb, J. **Amphoteric colloids. III. Chemical basis of the influence of acid upon the physical properties of gelatin.** Jour. Gen. Physiol. 1: 363–385. 1919.—The influence of acid upon the physical properties of gelatin is based on the fact that gelatin is an amphoteric electrolyte, which at its isoelectric point is but sparingly soluble in water, while its transformation into a salt with a univalent anion like bromine makes it soluble.—*Henry Schmitz.*

881. Macmillan, H. G. **Sunscald of beans.** Jour. Agric. Res. 13: 647–650. *Pl. 64–66.* 1918.

882. Watson, E. E. **Relation between habitat and structure in Pteris aquilina.** Rept. Michigan Acad. Sci. 20: 246. 1918.—Microscopical examination of sections of frond, petiole, and rhizome of plants from diverse habitats reveal structural differences as to cell size and number of stomata in the leaf and as to amount of interfascicular mechanical tissue in the petiole. There are no observable structural differences in the rhizome. [See Bot. Absts. 2, Entry 739.]—*R. P. Hibbard.*

883. Kitchen, P. C. **The relation between the structures of some coniferous woods and their penetration by preservatives.** Rept. Michigan Acad. Sci. 20: 203–221. *Pl. 11–12.* 1918.—*Larix laricina* and *Larix occidentalis* are very similar in most of their characters and why the former is more difficultly penetrable to creosote oil was not understood until a microscopical examination of the structures most concerned in the passage of the oil was made. The seeming paradox in penetration, upon close examination of the bordered pit structures, is explained by a difference in "penetrable bordered pit areas." [See Bot. Absts. 2, Entry 746.] —*R. P. Hibbard.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

884. De Candolle, Casimir. **Piperaceae a Jaheri in insulis Key collectae. [Piperaceae collected by Jaheri on the Key Islands.]** Meded. van's Rijks Herb. Leiden. No. 32: 1–2. 1918. —Five species are recorded of which the following are new to science: *Piper subepunctatum, P. oblongibracteum,* and *P. keyanum.*—*J. M. Greenman.*

885. Hallier, Hans. **Ueber Aublet's Gattungen unsicherer oder unbekannter Stellung und über pflanzengeschichtliche Beziehungen zwischen Amerika und Afrika. [On the position of doubtful or unknown genera of Aublet and on the plant-historical relations between America and Africa.]** Meded. van's Rijks Herb. Leiden No. 35: 1–33. 1918.—The author discusses in some detail about fifteen genera which were published by Aublet in the "Historie des plantes de la Guiane françoise" in 1775. The position of these genera in the natural system of classification has remained for many years in doubt. According to Hallier *Pacouria* Aubl. = *Landolphia* Beauv., *Sagonea* Aubl. = *Hydrolea* L , *Guapira* Aubl. = *Pisonia* L., *Licaria* Aubl. = *Octea* Aubl., *Managa* Aubl. = *Salacia* L., *Senapea* Aubl. = *Passiflora* L., *Voyara* Aubl. = *Capparis* L., *Courimari* Aubl. = *Sloanea* L., and *Tampoa* Aubl. = *Salacia* L.—*J. M. Greenman.*

886. Hallier, Hans. **Ueber Patrick Browne's Gattungen zweifelhafter Stellung.** [**On Patrick Browne's genera of doubtful position.**] Meded. van's Rijks Herb. Leiden No. 36: 1–6. 1918.—Certain genera published by Patrick Browne in "History of Jamaica," 1756, are discussed. According to Hallier *Catonia* P. Br. = *Miconia* Ruiz & Pav., *Collococcus* P. Br. = *Cordia* L., *Chloroxylum* P. Br. = *Zizyphus* Adans, *Ateramnus* P. Br. *Hippomane* L., and "*Vimen*" P. Br. = *Hyperbaena* Miers.—*J. M. Greenman.*

887. Hallier, Hans. **Die botanischen Ergebnisse der Elbert'schen Sunda-Expedition des Frankfurter Vereins für geographie und Statistik, III.** [**The botanical results of the Elbert Sunda-Expedition of the Frankfurt Society for Geography and Statistics.**] Meded. van's Rijks Herb. Leiden No. 37: 1–92. 1918.—The present article contains not only a report on the plants collected by Elbert in the Dutch East Indies, but it includes descriptions of new species from allied floral regions and notes on the geographical distribution of species of wide occurrence in the tropics. The following new species and new combinations are included: *Astilbe apoënsis, A. khasiana, Daphniphyllum buchananiifolium, D. papuanum, Bucklandia tricuspis.* (*Liquidambar tricuspis* Miq.), *Buxus nitidus* (*Austrobuxus nitidus* Miq.), *Geunsia grandiflora, G. quaternifolia, G. subternata, G. homoeophylla, G. serrulata, G. anisophylla, G. cinnamomea, Vitex padangensis, V. Cofassus* Reinw. var. *timorensis, V. Cofassus* Reinw. subvar. *pubescens, V. leptobotrys, V. secundiflora, V. flabelliflora, V. lasiantha, V. subspicata, V. tetragona, Mastixia premnoides* (*Vitex premnoides* Elm.), *Gmelina glandulosa, Clerodendrum viscosum* Vent. var. *nilagirica, C. confusum, C. adenophysum, C. catalpifolium, C. brunfelsiiflorum, C. haematolasium, C. macrophyllum* Bl. var. *sinuatolobata, C. barbafelis, C. Hettae, C. Elberti, Petreovitex ternata, Sphenodesme Winkleri,* and *Avicennia Rumphiana.*—*J. M. Greenman.*

888. Henrard, J. Th., and A. Thellung. **Leipdium flavum Torrey var. apterum nob.** Meded. van's Rijks Herb. Leiden No. 34: 1–2. *1 text fig.* 1918.—*Lepidium flavum* Torr. var. *apterum* is described as a new variety from San Bernardino County, California.—*J. M. Greenman.*

889. [Herzog, Th.] **Die von Dr. Th. Herzog auf seiner zweiten Reise durch Bolivien in den Jahren 1910 und 1911 gesammelten Pflanzen. Teil IV.** [**The plants collected by Dr. Th. Herzog on his seond journey through Bolivia in the years 1910 and 1911. Part IV.**] Meded. van's Rijks Herb. Leiden No. 33: 1–19. 1918.—This article consists primarily of a reprint from Engler's Bot. Jahrb. 54: Beiblatt No. 118. of Krause's contribution on the Loranthaceae and Gilg's contribution on the Gentianaceae.—*J. M. Greenman.*

890. Koidzumi, B. **A new species of Cherry tree.** Bot. Mag. Tôkyô 32: 54. 1918.—Koidzumi describes the following species as new to science: *Prunus kiusiana.*—*T. Matsumoto.*

891. Matsuda, Sadahisa. **Notes on Rehmannia found in China, Manchuria, and Korea.** [Article in Japanese.] Bot. Mag. Tôkyô 32: 140–142. 1918.—Five species and a few varieties are reported of which one variety is described as new to science. This variety was first described by T. Makino as new to science in "Zotei Somoku Zusetsu," Vol. III, 861, but no name was given by him. Matsuda proposes the name of *R. glutinosa Libosch,* var. *Makinoi.*—*T. Matsumoto.*

892. Nakai, Takenoshin. **Notes on wild cinnamon tree found in Ogasawara, Japan.** [Article in Japanese.] Bot. Mag. Tôkyô 32: 178. 1918.—The author states that *Cinnamomum pseudopedunclatum* Hayata is identical with *C. Loureirii* var. *scrobiculatum* Meisn. and proposes the name of *C. scrobiculatum* (Meisn.) Nakai for this species.—*T. Matsumoto.*

893. Swingle, Walter T. **Merrilia, a new Rutaceous genus of the tribe Citreae from the Malay Peninsula.** Philippine Jour. Sci. Bot. 13: 335–343. *Pl. 5–6.* 1918.—*Merrillia,* a new genus of the Rutaceae, is described and illustrated. The genus is based on *Murraya caloxylon* Ridley and is native in southern Siam.—*J. M. Greenman.*

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ENTRIES 894-1161

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

894. REIDY, MARGARET M. **Ecology.** School Sci. Math. **19**: 131-134. Feb., 1919.—To survive, plants and animals must solve the problems of food and protection. Adaptations of insects and flowers are of special interest. The sumach fruits afford food and shelter for many insects. The carpenter bee excavates pith of sumach. Other similar cases furnish topics of great interest for high schools.—*A. Gundersen.*

895. VAN CLEAVE, H. J. **The field excursion in high school biological courses.** School Sci. Math. **19**: 7-10. Jan., 1919.—Definiteness of object is very essential. Object must be distinctly limited, as "Insects as carriers of pollen," "Birds as carriers of seeds."—*A. Gundersen.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

896. ALWAY, F. J., G. R. McDOLE, AND R. S. TRUMBULL. **Relation of minimum moisture content of subsoil of prairies to hygroscopic coefficient.** Bot. Gaz. **67**: 185-207. Mar., 1919.—Soil moisture studies were carried out on the prairies of Nebraska both in the semi-arid parts of the state dominated by the short-grass and in the more humid portions near Lincoln characterized by the prairie-grass associations. Samples were taken at intervals over a 6-year period at different depths and the water content and hygroscopic coefficient determined, the moisture conditions being expressed as the ratio of these two findings. This ratio gives not only the relative moistness but also indicates whether free water or growth water is present. The subsoils of the semi-arid regions were found to be persistently dry, the ratio ranging from 1.5 to 1.1 and after droughts decreasing to 1.0 to depths of 6-12 feet. Even extreme and prolonged droughts brought no further reduction or moisture content. Humid prairies showed no reduction of moisture content in their subsoil during drought to a greater depth than 5 feet, the deeper subsoil exhibiting a ratio of 2.0 to 2.4. The dry condition of the subsoil in the semi-arid portions is attributed to the presence of perennials with a root range of 15 feet or more, similar plants being absent or few in the more humid regions. In the arid portions during wet periods following droughts the upper moistened portion of the subsoil will be isolated from any deeper lying moist layer by a zone in which the subsoil is too dry to permit the penetration of plant roots.—*Geo. D. Fuller.*

897. Benecke, W. **Pflanzen und Nachtschnecken. [Plants and Slugs.]** Flora 111, 112: 450–477. 1918.—In a paper primarily zoological in content, author divided slugs according to their food preference into pleophagous, herbivorous, and mycophagous species. When offered agar disks saturated with certain food substances, pleophagous species ate either sugar or proteid disks, mycophagous species preferred peptone agar, and herbivorous forms sugar agar. Glycogen, which occurs in certain fungi, was an attraction to two species, while mannite had no effect. Both pleophagous and mycophagous species ate many species of agarics, but not all species tried. Several species, notably acrid forms of Russula and Lactarius, were eaten more readily by mycopahgous slugs. Several species poisonous to man, including *Amanita muscaria* and *A. phalloides*, were eaten readily. The author accepts Stahl's old conclusion that many plants are protected against slugs by their mechanical properties, but does not know whether mechanical devices are of equal efficiency against all three food-classes.—*H. A. Gleason.*

898. Betts, M. Winifred. **Notes on the autocology of certain plants of the Peridotite Belt, Nelson. Part I—Structure of some of the Plants.** (No. 1). Trans. New Zealand Inst. 50: 230–243. *15 fig.* June, 1918.—This is the initial number of a series of short papers to describe the anatomy of a number of representative plants of the Mineral Belt. These plants belong to three principal associations: (1) Shrubland, (2) Open Scrubland and (3) Tussock Grassland. Nine plants are considered in this paper and the description of leaf and stem anatomy together with growth-form is given.—*P. D. Strausbaugh.*

899. Diels, L. **Über Wurzelkork bei Pflanzen stark erwärmter Boden. [Periderm in plants of heated soils.]** Flora 111, 112: 490–502. *3 fig.* 1918.—Author describes the structures appearing at or near the surface of the ground on various species of Australian xerophytes. These include a copious development of scales or hairs, very lacunar cortex, and conspicuous development of the periderm. Without denying the effect of such structures in reducing transpiration, he infers that they are of chief value as insulation against the superheating of tissues from contact with the hot soil, which probably reaches temperatures of 55–65°. He made no measurements of actual soil temperatures nor of the internal temperature of the plants with these structures.—*H. A. Gleason.*

900. Dufrenoy, J. **Les conditions écologiques du développement des champignons parasites.—Étude de géographie botanique. [Ecological conditions in the development of parasitic fungi.]** Bull. Soc. Mycol. France 34: 8–26. June, 1918.—A comparison of collections made at elevations at 1200 to 2000 m. in the Pyrenees with those listed by Fragoso for Cataluna, Spain. Most of the fungous diseases found in Cataluna have been found in Barèges. The Pyrenees are not a barrier to the dissemination of the fungi.—There exists, however, certain differences between the French and Spanish floras. They are for the most part explained by lack of data on the mycological flora of the Pyrenees. 18 of the 25 rusts found in Barèges are reported by Fragoso for Cataluna but Fragoso does not record *Puccinia simplex* on barley, or *Melampsorella caryophylleum* on fir.—A study of the distribution in altitude of fungous diseases leads to the conclusion that there exists among parasitic fungi, species of the plain, species of the mountains and species occurring indifferently. The factor determining the specialization seems to be not temperature nor humidity but radiation. The species of the plain slightly pigmented, cannot stand the intense radiation of high altitudes. The species of the mountains have strongly colored spores or are protected by the color reaction of the host.—Any influence of altitude on the occurrence of fungous diseases depends on internal unknown factors in each host, and if the host is modified in its susceptibility, it has not been determined.—There is a short chapter on biotic factors and fungous parasites in which is discussed fungi attacking other fungi and fungi attacking insects.—*D. Reddick.*

901. Fuller, George D., and A. L. Bakke. **Raunkiaer's "Life forms," "leaf-size classes," and statistical methods.** Plant World 21: 25–37, 57–63. Feb., Mar., 1918. [Translations of two papers: Raunkiaer, C. **Om Bladstorrelsens Anvendelse i den biologiske Plantegeografi.**

Bot. Tidskr. 33: 225–240. 1916. RAUNKIAER, C. **Om Valensmetoden.** Bot. Tidskr. 34: 304–311. 1917.] The importance of leaf size in relation to environment is discussed. Phanerophytes (tall woody plants) are subdivided by the author into six classes with leaf sizes between the limits given: leptophylls (less than 25 sq. mm.), nanophylls (below 225 sq. mm.) microphylls (2025 sq. mm.), mesophylls (18,225 sq. mm.), macrophylls (164,025 sq. mm.), megaphylls (above last figure). This classification may also be applied to chamaephytes. Its use is shown to give more exact results to statistical studies of vegetation.—The valence method provides the means of determining the biological spectrum in a manner that takes account of the relative frequency and areal extent of the plants of the several life forms.—*Forrest Shreve.*

902. HARPER, R. M. **Some dynamic studies of Long Island vegetation.** Plant World 21: 38–46. 1918.—The herbaceous vegetation was removed from one square yard in each of seven grass formations, and determinations were made of net weight, dry weight and ash.—The greatest dry weights and weights of ash were shown by **Phragmites** and **Typha**, the lowest by grasses of the Hempstead Plains. Comparisons are made with similar work in other regions.—*Forrest Shreve.*

903. HARPER, ROLAND M. **A phytogeographical sketch of southern Maryland.** Jour. Washington Acad. Sci. 8: 581–589. Nov., 1918.—In his study of this area the author has divided it into 5 separate divisions; (1) the fall-line clay hills, (2) the green sand belt, (3) the bay shore hills, (4) the Brandywine plateau, and (5) the St. Mary's region. These regions are described separately and a list of the commonest trees found in each is given with brief notes concerning the shrubs and herbaceous forms. [See Bot. Absts. 1, Entry 1153.]—*P. D. Strausbaugh.*

904. HARPER, ROLAND M. **A new seasonal precipitation factor of interest to geographers and agriculturists.** Science 48: 208–211. Aug., 1918.—A brief description is given of a new precipitation map of the United States which indicates the regions receiving an early summer rainfall on the one hand, and those characterized by late summer rainfall on the other. The author uses this map as a basis in pointing out certain correlations between this distribution factor and the soils, and also the vegetation types associated with these soils. [Abst. in Exp. Sta. Rec. 39: 511. 1918.]—*P. D. Strausbaugh.*

905. KEARNEY, THOMAS H. **Plant life on saline soils.** Jour. Washington Acad. Sci. 8: 109–125. Mar., 1918.—A general review of the more important facts concerning halophytic vegetation. Among other things the author discusses the distribution, structure and water economy of halophytes; osmotic pressure in roots and leaves, salt content of the tissues and the importance of sodium to halophytes and in plant nutrition in general. [Rev. by MACDOUGAL, calling attention to bibliographic omissions, in: Plant World 21: 161. 1918.]—*P. D. Strausbaugh.*

906. MACCAUGHEY, VAUGHAN. **An endemic Begonia of Hawaii.** Bot. Gaz. 66: 273–275. Sept., 1918.—The Begoniaceae are almost entirely without representatives in the Pacific region, their greatest display being in the Andean portion of South America as far north as Mexico, and in the Himalayas extending southwest to the Malay Peninsula. Two of the four genera are monotypic; one of these, Symbegonia, occurs in New Guinea, and the other, Hillebrandia, is found only in Hawaii. The presence of this endemic form, *Hillebrandia sandwicensis*, in the Hawaiian flora furnishes additional evidence that "at one time in the history of the Pacific Basin the Hawaiian Islands were much more closely associated with the Andean and South Pacific regions than they are at present." This endemic species lives in shady places near water-falls or in the depths of shaded ravines, with an altitudinal range of from 3000–6000 feet.—*P. D. Strausbaugh.*

907. MACDOUGAL, D. T. [Rev. of: KEARNEY, T. H. **Plant life in saline soils.** Jour. Washington [D. C.] Acad. Sci. 8: 109–125. Mar., 1918.—(See Bot. Absts. 2, Entry 905.)] Plant World 21: 161. 1918.

908. Ostenfeld, C. H. **Stray notes from the tropical West Australia.** Dansk. Botanisk. Arkiv. 2: 1–29. *9 fig., 3 pl.* 1918.—This account is based on observations made during hasty visits at five of the ports and deals with the vegetation of the coastal region only. Five formations are mentioned and described: (1) the mangrove formation; (2) the sandy sea-shore formation; (3) the salt pan formation; (4) the sand dune formation, and (5) the savannah forest. A list of the species collected is appended.—*P. D. Strausbaugh.*

909. Robbins, W. W. **Successions of vegetation in Boulder Park, Colorado.** Bot. Gaz. 65: 493–525. *14 fig.* June, 1918.—Two successions are described; one, a hydrarch succession associated with the glacial lakes and the silt-sand flood plains; the other, a xerarch succession involving the level, gravel areas exposed by the rapid drainage of the old glacial lake which formerly covered the major portion of the Park, and the flood plains of coarser materials such as small boulders and coarse gravel. In the hydrarch succession the initial stage is an Eleocharis-Ranunculus association followed by the sedge moor; this gives place to the willow thicket which in turn is followed by meadow grassland or meadow scrub. This succession is best observed on the borders of the oxbow lakes. This meadow culmination is regarded as a temporary climax only. The cobblestone flood plains represent a habitat characterized by rather extreme conditions of temperature and moisture supply. The initial stage is xerophytic consisting of a few plants including mosses, struggling to establish themselves in the loose sediment between the stones. This is followed by a mixed community that gives way to the willow thicket followed by the meadow scrub. The willow thicket may be succeeded by sedge moor which sometimes remains for a long period. "The seasonal aspects of the sedge moor change slowly" owing to the fact that species are relatively few and the dominance of Carex conceals the other forms. Even more important are the soil, temperature and moisture factors which show the least seasonal fluctuation in this stage. "Edaphic conditions within a community control the seasonal changes of the vegetative covering." Lichens and *Selaginella densa* take first possession of the glacial gravels and are followed by a mixture of xerophytic forms and the incoming of grasses passing at once into the characteristic "dry grassland" of these areas. Dry grassland has all appearances of being the culminating stage but "the combined activities of biotic and physiographic factors are resulting in the slow disappearance of the dry grassland and the establishment thereupon of a mesophytic grassland." Though the Park is fringed by three forest associations there is no evidence of invasion of the meadow by trees due to the fact that the extreme conditions of exposure in these areas make it very difficult for three seedlings to acquire a foothold. The author makes note of the scarcity of aquatic plant life in the lakes and ponds of the region and believes that the paucity is due in part to the coldness of the waters, and in part to the absence of necessary salts from the very soft water of these lakes.—*P. D. Strausbaugh.*

910. Robertson, Charles. **Pollination of Asclepias cryptoceras.** Bot. Gaz. 66: 177. Aug., 1918.—A brief query concerning mode of pollination in Asclepias. Author believes that in *Asclepias cryptoceras* pollination may be effected by other long-tongued bees or butterflies as well as by bumblebees.—*P. D. Strausbaugh.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

911. Arnould, A. **L'impôt forestier en Angleterre. [Forest taxation in England.]** [Review of: Buccleuch, Duke of. **Taxation of woodlands.** Trans. Roy. Scot. Arb. Soc. 32: 169–173. 1918.] Rev. Eaux et Forêts 57: 2–3. 1919.—The increasing burden of taxation on forest property is not peculiar to France, but exists also in England. In two specific instances there taxes amounted to 122 per cent and 132 per cent of the total revenue. Forest products are the only kind of property subject to the so-called "death duty" of 21 per cent and also to income and supertaxes amounting to 52.5 per cent. Because of the heavy burden imposed by this double taxation reforestation is financially unprofitable.—The author expresses the hope that forest owners in England will be able to secure a fair and rational income tax on forests which can be adapted to French conditions.—*S. T. Dana.*

912. BARBEY, A. **Chronique Suisse. [Swiss notes.]** Rev. Eaux et Forêts 57: 21–24. 1919.—Increased demands for wood, largely for American barracks in France, have caused a considerable advance in wood prices during the past year. Transportation of forest products has been difficult. Price fixing for coniferous timber has been inaugurated by the Government, and special steps have had to be taken by the cantons to keep the pulp and paper factories in operation. The war has emphasized the need for careful management of Switzerland's forest resources under the direction of technically trained men, in order to wipe out the annual deficit of 700,000 cubic meters in the production of forest products which existed in 1913. The Canton of Vaud in 1918 furnished an example worthy of imitation elsewhere by increasing the number of local foresters from 11 to 20. This resulted in reducing the area, of from 7000 to 11,000 hectares, formerly assigned to each forester, to 4000 hectares.—*S. T. Dana.*

913. BOERKER, R. H. D. **Our national forests.** New York, 1918.—See Bot. Absts. 2, Entry 917.

914. BUCCLEUCH, DUKE OF. **Taxation of woodlands.** Trans. Roy. Scot. Arb. Soc. 32: 169–173. 1918.—See Bot. Absts. 2, Entry 911.

915. CHANCEREL, L. **Les meilleures essences de boisement dans la région du Centre. [The best species for forestation in the region of the Centre.]** Rev. Eaux et Forêts 57: 31–33. 1919.—Certain planting experiments undertaken in November, 1909, on poor, silicious soils, very dry in summer and wet in places in winter, indicate *Quercus palustris*, *Q. rubra*, *Q. phellos*, *Betula nigra*, *Alnus cordifolia*, *Populus balsamifera*, and *P. nigra* var. *angulata robusta*, as the best broadleaf trees for the region, to secure a quick growth and improvement of the soil. *Pinus maritima* var. *corte* (in mixture with *P. sylvestris*), *Pseudotsuga douglasii* (*taxifolia*), *Picea menziesii*, and *Cedrus deodara* are similarly regarded as the best coniferous species for the region. Elm, maple, basswood, ash, hornbeam, chestnut, hickory, and walnut proved unsuitable.—*S. T. Dana.*

916. DEMORLAINE, J. **L'importance stratégique des forêts et la guerre. [The strategic importance of forests in the war.]** Rev. Eaux et Forêts 57: 25–30. 1919.—In addition to their value as producers of wood for military purposes, forests have a tactical importance in war by furnishing local shelters for machine guns, observation outposts, etc., and, where they occur in continuous stands over a considerable area, a strategic importance by furnishing shelter for large bodies of troops. The German advance across the Vosges mountains in 1914 was stopped by the great forests of Alsace, the Vosges, and Lorraine. Paris was saved both in 1914 and 1918 by the forests of Villers-Cotterets and of Compiègne. In 1918 the German retreat was favored by the great forests of the Ardennes.—The French forests should be given a long period of rest, and the Germans forced to replace in kind the wood for the destruction and premature use of which they have been responsible. Intensive hunting in the devastated forests should be stopped, and the game should be allowed to keep the rodents in subjection, which have largely disappeared as a result of military occupation.—*S. T. Dana.*

917. GAGER, C. STUART. [Rev. of: BOERKER, RICHARD H. DOUAI. **Our national forests.** New York, 1918.] Torreya 19: 14–15. 1919.—The book is invaluable as a survey of the history and activities of the U. S. Forest Service, and of the need and value of its work. It is specially recommended as a reference book.—*J. C. Nelson.*

918. GUYOT, CH. **Jurisprudence. [Legal matters.]** Rev. Eaux et Forêts 57: 4–5. 1919. —There is nothing in the Code forestier, or in other laws of France, to prevent a private owner from appointing a woman as forest guard. When such an appointment is agreed to by the prefect or subprefect, the civil court must accept the oath of office of the woman so appointed provided no other legal barrier to the appointment exists.—*S. T. Dana.*

GENETICS

George H. Shull, *Editor*

919 Alderman, W. H. **Experimental work on self-sterility of the apple.** Proc. Amer. Soc. Hortic. Sci. 14: 94–101. 1918.—See Bot. Absts. 1, Entry 957.

920. Anonymous. **Plant breeders find new tobacco hybrid.** Jour. Heredity 9: 354–356. *Fig. 7–9.* Dec., 1918.—Montgomery Seedleaf tobacco (Hybrid No. 199) is result of cross between Washington (Ohio) Seedleaf and Big Graham. Parents have drooping leaves, hybrid erect. Latter is productive and seems to possess drouth resistance.—*R. J. Garber.*

921. Anonymous. **Environmental factors and heredity differences influencing fruiting of cotton.** Jour. Heredity 9: 372–374. Dec., 1918.—Quotations from Ewing, E. C., Technical Bull. 8, Mississippi Agric. Coll. *93 p.* June, 1918. Discusses importance of earliness as it involves resistance to boll weevil, and mentions several factors that go to make up earliness. —*Merle C. Coulter.*

922. Anonymous. **Heredity of tumors of the nerves.** Jour. Heredity 9: 380–381. Dec., 1918.—Preiser and Davenport (Amer. Jour. Med. Sci., Oct., 1918) published evidence interpreted to mean that multiple neurofibromatosis is Mendelian dominant. In this disease sessile or pedunculated swellings of variable size, containing nerve fibres, appear on body. Number varies and increases with age. Hashimoto (1890) made out 4503 on middle-aged Japanese man. Since only one case in 2000 coming to clinics for skin diseases is of this sort, affection is very rare. It occurs in father and child quite as frequently as in mother and child and is therefore not transmitted through placenta. In some cases it actually seems to skip a generation, but authors consider this may be due to occasional failure of a dominant trait to appear, as in polydactylism of fowl. Assertion is made that trait is dominant. There are 243 cases described of which 158 had one parent affected. In 34 cases neither parent was recorded as affected. The other 51 cases were left out of "families charted." There are then at least 65 per cent showing direct descent, but further evidence is needed to include this as an undoubted Mendelian dominant.—*P. W. Whiting.*

923. Anonymous. ["B."] [Rev. of: Ziegler, H. E. **Die Vererbungslehre in der Biologie und in der Soziologie, usw. [Genetics in biology and sociology, etc.]** (See Bot. Absts. 2, Entry 963.)] Anat. Anzeig. 51: 511–512. Dec. 30, 1918.—Ziegler's emphasis on theory of chromosomes and their reduction as solution of results of experimental genetics differentiates him from investigators like Johannsen who neglect it, or like Plate and Goldschmidt who only incidentally notice this theory. Section of book on problems of sociology and political science represents Ziegler's life work; his deductions in these fields are based on biological grounds. Reviewer thinks it hopeless at present for scientific facts to influence views of politicians or mass of people.—*J. P. Kelly.*

924. Anonymous. **"Diluting" colors of carnations.** Florists' Exch. 47: 285. Feb. 15, 1919.—Refers to attempt of New Jersey Experiment Station to secure scarlet carnation by crossing maroon variety, Princess Dagmar, with white variety called Matchless; seedlings that resulted were widely varying but no mention is made of scarlet among them.—*James P. Kelly.*

925. Babcock, E. B., and J. L. Collins. **Genetics laboratory manual.** 1st ed. *16 × 24 cm., xi + 56 p., 14 fig.* McGraw-Hill Book Co.: New York. 1918.—Intended to supplement combined lecture and recitation course consisting of one 3-hour period a week for 15 or 16 weeks. Exercises comprise four lines of study; (1) *Drosophila* breeding experiments; (2) Variation in plants; (3) Mendelism in plants, (4) Plant and animal breeding. Three alternative exercises are suggested under most of the numbers thus permitting course to be varied from year to year. Appendix contains Pearl's table for testing goodness of fit in Men-

delian ratios, instructions for rearing Drosophila for class use and research, list of laboratory materials needed for Drosophila experiments, and list of selected works for reference, and periodicals treating of variation, heredity, breeding and evolution.—*E. E. Barker.*

926. BOULENGER, G. A. **L'évolution est-elle réversible? Considérations au sujet de certains poissons. [Is evolution reversible? Considerations relating to certain fishes.]** Compt. Rend. Acad. Sci. Paris 168: 41–44. 1919.—See Bot. Absts. 3, Entry 598.

927. BOULENGER, G. A. **Un cas d' évolution ontogénique á rebours chez un Lézard africain (Eremias lugubris A. Smith). [A case of reversed ontogenetic evolution in an African lizard (Eremias lugubris A. Smith).]** Compt. Rend. Acad. Sci. Paris 168: 78–80. 1919.—See Bot. Absts. 3, Entry 599.

928. BURKHOLDER, W. H., I. M. HAWLEY, AND E. W. LINDSTROM. **Some results of the New York State bean investigation.** Proc. New York State Fruit Growers' Assoc. 16: 120–125. 1918. [See Bot. Absts. 1, Entry 84.]

929. COCKERELL, T. D. A. **Hybrid perennial sun-flowers.** Bot. Gaz. 67: 264–266. Mar., 1919.—Several supposed hybrids between various species of perennial sunflowers are noted and in one case, described in detail. Such hybrids could reproduce vegetatively and give rise in nature to a uniform group of plants of considerable extent with aspect of true species. *Helianthus orgyaloides*, nov. is presumably a hybrid between *H. orgyalis* DC. and *H. Maximiliani* Schrad. A form of this hybrid is known to the trade. Possibly, through hybridization in the genus *Helianthus*, new forms with attributes of species may be demonstrated.—*Orland E. White.*

930. COLLINS, J. L. **Chimeras in corn hybrids.** Jour. Heredity 10: 2–10. *7 fig.* Jan., 1919.—Mosaic seeds of maize having part colored and part uncolored areas and other seeds having part starchy and part wrinkled areas in the endosperm of hybrid seeds in which the dominant characters came from male parent are cônsidered to be due to mutation in somatic tissue. An F_2 partly colored seed, if it is found that the embryo is homozygous for the color, is expected to furnish proof, between the former idea of Correns and of Webber of independent development of female and male nuclei and the theory of mutation as the cause. Somatic segregation is not considered a possible interpretation. Occurrence of similar phenomena in fig, canna lily and gladiolus is mentioned and illustrated.—*D. F. Jones.*

931. COOK, O. F. **Evolution through normal diversity.** Jour. Washington Acad. Sci. 9: 192–197. April 4, 1919.—Attention is directed to the observation of THOMAS MEEHAN (**Contribution to the life-histories of plants.** No. X. Proc. Acad. Philadelphia 1894 : 53. 1814.) "that there is an innate power to vary coexistent with the species itself, independent of any conditions of environment." Author points out that bearing of this conception upon evolutionary progress was obscured by Meehan's belief that contrasted characters would tend to disappear through swamping effect of intercrossing. Persistence of many divergent or contrasted characters in hybrid populations is recognized as refuting this hypothesis and idea that diversity is lost through crossing is now discarded. Instead of tending to impede evolution, intercrossing of lines of descent in species is held to present the condition most favorable for preservation and extension of new characters. With this fact recognized it follows that new characters may be preserved in natural species without individuals being segregated by selection or otherwise.—Author disapproves tendency of geneticists to regard species as consisting normally of uniform, identical individuals, because in nature endless individual diversity is found, which accords with conception of continued development and gradual diffusion of inherited characters among the members of a species. Conclusion is reached that "phenomena of variation and diversity are largely differences of expression, including accommodation, or varied expression of adaptive characters, to suit different conditions of existence."—Evolution is defined as process of continuous integration and differentiation of characters, the two essential conditions of which are normal diversity ("heterism") and free intercrossing of lines of descent ("symbasis").—*J. H. Kempton.*

932. Delage, Yves. **Suggestion sur la nature et la causes de l' hérédité ségrégative (caractères mendéliens) et de la hérédité agrégative (caractères non mendéliens). [Suggestion as to the nature and the causes of segregative heredity (Mendelian characters) and of aggregative heredity (non-Mendelian characters).]** Compt. Rend. Acad. Sci. Paris **168**: 30–36. 1919.

933. DeVries, Hugo. **Kreuzungen von Oenothera Lamarckiana mut. velutina. [Crosses of Oenothera Lamarckiana mut. velutina.]** Zeitschr. indukt. Abstamm. Vererb. **19**: 1–38. Mar., 1918.—*Oenothera Lamarckiana* mut. *velutina* (syn. *O. Lamarckiana* mut. *blandina*) is a slender, narrow-leaved mutant with a loose inflorescence and resembles *rubrinervis* more closely than its parent *Lamarckiana*. It is further distinguished by having a high percentage of fertile seeds and does not give the twin hybrids *laeta* and *velutina* but on the contrary uniform hybrids of the latter type when crossed with other species; this indicates that *laeta* gametes are not formed and that the plant is pure *velutina*. Crossed with *Lamarckiana* the first generation presents *laeta* and *velutina* hybrids but the former group consists of two types differing in respect to their heritable characters and named respectively *laeta letalis* and *laeta rediviva*. More than half of the seeds of *laeta letalis* are sterile and its offspring, when selfed, are uniform; it throws no *velutina*. In contrast, *laeta rediviva* has almost no sterile seeds and splits into *velutina* and *laeta* the latter presenting three types, (1) one with reddish leaves, (2) one with green leaves, and (3) a form intermediate, in the ratio of 1:1:2. The first two types when selfed are constant; the third form, making up about half of the assemblage splits into the same three types and in the same ratio.—The results of other crosses are reported and also a number of crosses involving several different species of Oenothera. There is discussion of lethal factors in *Oenothera Lamarckiana* and of mass mutation. —*B. M. Davis.*

934. Dollfus, Robert. **Continuité de la lignée des cellules germinales chez les Trématodes Digenea. [Continuity of the germ-cell line in the trematode Digenea.]** Compt. Rend. Acad. Sci. Paris **168**: 124–127. 1919.—Investigations of larvae of a number of species of Distomata and Monostomata gave following results: Sporocysts, rediae and cercariae arise from single germinal line of cells and not from somatic cells lying in walls of the sporocysts or rediae. Germ-cell line, which originates from blastomeres of fertilized egg, gives rise to sexual cells of adult and in course of life cycle of the trematodes, to somatic cells which form the tissues of these sporocytes, rediae, and cercariae. Thus somatic tissues of these larval forms take no part in origin of succeeding stage in life history of these organisms, and are "steriles" in this respect, but simply protect and transport germ-cell line. Author presents diagram showing continuity of germ cells from fertilized egg to fertilized egg of succeeding generation, with list of tissues on one side that disappear without producing descendants, and a list on other side that arise from germ-cell line up to formation of eggs by adult trematode.—*R. W. Hegner.*

935. Fruwirth, C. **Die Umzüchtung von Wintergetreide in Sommergetreide. [The breeding of winter cereals into summer cereals.]** Zeitschr. Pflanzenzücht. **6**: 1–46. Mar., 1918.—Early spring planting of winter cereals permitted practically normal maturation in many cases. Later planting produced few fertile stalks or none at all. Species, varieties and selected lines differ in degree of normal production when planted together at different times. Exposure of seed to high and low temperatures and to chloroform previous to planting had no differentiating effect. Exposure of plants to different temperatures throughout the winter and at different intervals made no pronounced difference. By taking two lots of seed from the same head, in many experiments with different sorts of wheat, and planting one lot in the spring and the other in the fall during several years and then planting the two lines at the same time no differences were observed. A difference found with rye by the same method was attributed to a presumable heterozygosity made possible by natural cross-pollination. Common cereals of Europe considered to be originally winter forms. Some have lost ability to live over winter. Some have become particularly adapted to spring

planting and may or may not retain winter hardiness. Several varieties grown for many years as spring grains were shown to be still capable of fall sowing. Dual types which can be grown successfully by either fall or spring sowing were found to exist in many varieties. Changing of a winter form into a summer form consists essentially in sorting out of these different types.—*D. F. Jones.*

936. GLASER, O. C. **Inheritance of absence of the sense of smell.** Jour. Heredity 9: 347. Dec., 1918.—Certain person lacks sense of smell entirely. Strong odors are simply "felt." Brother and mother are likewise defective. First cousin shows same defect, coming, however, from another family. Locus of origin, in Russia, is apparently inbreeding this deficiency. It is safe to say that character is hereditary, although exact method is uncertain. [See Bot. Absts. 2, Entry 957.]—*P. W. Whiting.*

937. GOODALE, H. D., AND GRACE MACMULLEN. **The bearing of ratios on theories of the inheritance of winter egg production.** Jour. Exp. Zoöl. 28: 83–124. Apr. 5, 1919.—Authors present a theory alternative to Pearl's, applicable to inheritance of fecundity in the domestic fowl. It may be stated as follows:—Winter egg production falls into one of two classes—high (over 30) and mediocre (under 30); high fecundity depends upon simultaneous presence of two factors, *A* and *B*, while mediocre production depends upon presence of not more than one of these two factors in duplex, simplex or nulliplex condition; these two factors are inherited according to usual dihybrid scheme.—For this theory author mentions following advantages: (1) It is simpler because it does not involve sex-linkage, (2) it accounts genetically for birds in the over-30 class, for which Pearl's theory requires supplementary explanation, and (3) the only marked departures from expected ratios are downward, i.e., there is a deficiency of high producers.—On basis of data presented, author concludes that Pearl's theory, though not disproved, is not of universal applicability. Author believes, however, that mode of inheritance of winter egg production remains to be ascertained and that problem should be approached from a new angle, namely that of inheritance of the several factors whose combined action results in production of given number of eggs for winter period.—*P. B. Hadley.*

938. HALSTED, BYRON D. **Possible correlations concerning position of seeds in the pod.** Bot. Gaz. 67: 243–250. Mar., 1918.—Study of the relationship between number and position of seeds in pod of Lima bean and viability of seed and character of pods produced. The modal number of ovules and seeds is three. Concludes that seeds from central region of pods are most viable and produce larger number of pods than do those from base or tip. Seed maturation and seed weight increases from proximal to distal end of pods. Seeds borne in pods in which a portion of ovules are aborted are heavier than those in which all ovules mature.—*J. Arthur Harris.*

939. HARLAND, S. C. **A note on the inheritance of anthocyanin pigmentation in castor bean crosses.** Agric. News, Barbados 17: 403. Dec. 28, 1918.—Observations on crossing semi-wild type of castor bean with ornamental variety known as *Ricinus Gibsoni*. Latter had red capsules, stems and leaves; former had green capsules and pink stems. F_1 had green capsules but red stems; F_2 consisted of 102 green-capsuled and 31 red-capsuled plants. Author refers to some variation in recessive class indicating modifying factors. F_1 seed color was intermediate brown; no F_2 red capsules contained F_1 seed color and author suspects genetic correlation [linkage].—*James P. Kelly.*

940. HARLAND, S. C. **Notes on inheritance in the cowpea. Anthocyan colouration of stem and leafstalk, and New Era pattern of the seed coat.** Agric. News, Barbados 18: 4–5. Jan. 11, 1919.—Cowpea varieties with anthocyanin near leaf and leaflet junctions crossed with totally unpigmented kinds gave pigmented F_1 generation, and F_2 of parental types in ratio of 132 pigmented to 39 unpigmented. Of 15 F_2 pigmented plants tested, 4 were constant and 11 showed simple segregation again; single genetic difference is inferred. Inheritance of seed coat color determined in cross of cowpea varieties called New Era and Para; former has

seeds brown dotted with blue; latter has seeds pale cream unspotted. F_1 bore seeds like New Era with lighter spots; F_2 consisted of three seed types, New Era (including those like F_1), a new type that was brown and unspotted, and Para-type; ratio approximated 9:3:4. Two factors are assumed, *R*, producing brown pigment in seed coat, and *E* causing New Era pattern; *E* acts only in presence of *R*.—*James P. Kelly.*

941. HARLAND, S. C. **Notes on inheritance in the cowpea. The color of the seed coat pattern.** Agric. News, Barbados 18: 20. Jan. 25, 1919.—Data on some genetic relationships of black, brown, maroon, red and white coloration. F_2 from cross of brown and red gave ratio of 12 brown, 3 maroon: 1 red; brown parent interpreted as having factor *N* for brown and hypostatic factor *M* for maroon; red parent as lacking both. Red proved recessive [hypostatic] to all colors investigated and was crossed to pure white in Para variety; F_2 of 10 brown: 3 red: 4 white-seeded plants revealed latent *N* factor in Para; there is no maroon factor in Para; latter crossed with maroon variety gave brown-seeded F_1 of 12 plants,—no F_2 was grown. Para crossed with black gave F_2 ratio approximately 9 black: 3 brown: 4 white; both Para and black are assumed to have *N*, with black also carrying *B* (black) and *R* (red) factors which Para lacked; *B* is without effect in absence of *R*. Factor *R* is prerequisite for expression of *B*, *N*, and *M*.—*J. P. Kelly.*

942. HARTWELL, B. L., AND S. C. DAMON. **Miscellaneous experiments with corn.** Rhode Island Agric. Exp. Sta. Bull. 173. *27 p.* 1918.—Three distinct strains of White Cap flint corn crossed among themselves gave no increase in yield of grain for F_1 generation. The first hybrid generation from two strains differing in stover production yielded an intermediate amount. In one experiment the seed grains of Rhode Island White Cap corn were separated into groups of high and low specific gravity; light one yielded at rate of 81.1 bushels per acre and heavy ones at rate of 87.4 bushels per acre. Seed grain produced under crowded and uncrowded conditions gave no significant differences in yield in next crop. In one trial varying amounts of nitrogen supplied to seed-producing plants led to no differences in yield of progeny grown on uniform soil.—*J. P. Kelly.*

943. HARWOOD, W. S. **New creations in plant life.** New York, 1918. Rev. by ORLAND E. WHITE in: Torreya 19: 15–17. 1919.

944. IBSEN, HEMAN L. **Synthetic pink-eyed self white guinea-pigs.** Amer. Nat. 53: 120–130. *5 fig.* Mar.–Apr., 1919.—Pink-eyed self white guinea-pigs lacking albino factor (C_a) were produced by mating a pink-eyed (*pp*) non-yellow (C_rC_r) tortoise (e^pe^p) to a self red of composition, dark-eye (*PP*), full pigmentation (*CC*), non-extension (*ee*). F_1's ($PpCC_re^pe$) appeared ordinary tortoise. F_2 generation should give a pink (*pp*), non-yellow (C_rC_r), non-extended (*ee*) among 64 individuals. Since obtaining a large F_2 generation was necessarily slow, a $PpCC_re^pe$ male was mated to a PPC_dC_aee female. One of the offspring, appearing somewhat like albino since he carried brown (*b*) recessive to black (*B*), proved to be dark-eye carrying pink-eye (*Pp*), non-yellow carrying albinism (C_rC_a), non-extended (*ee*). When mated to a pink-eye (*pp*), dilute carrying non-yellow (C_dC_r), tortoise carrying non-extension (e^pe), he sired among twelve offspring one male and one female that were pink-eyed, non-extended, non-yellow, or the desired self white. When crossed with true albinos (C_aC_a), the female proved to be ppC_rC_aee and the male ppC_rC_ree. These two have produced 24 offspring, all white like themselves. In tests for recessive albinism, one of them, mated to a *PPEE* albino, produced a dark-eyed *self-black*. These synthetic whites satisfy fanciers' standard better than general run of true albinos lacking pigment altogether. "Pink-eyed" (*pp*) albinos also have been produced and are up to standard. Another way of producing pink-eyed white would be to combine Castle's dark-eyed self white (extended white spotting) with pink-eye. These would be unstable in breeding tests. The production of pink-eyed white with all recessive factors except albinism would be of value in linkage experiments.—*P. W. Whiting.*

945. JELINEK, J. **Beitrag zur Technik der Weizenbastardierung. [Contribution to the technique of wheat crossing.]** Zeitschr. Pflanzenzücht. 6: 55–57. Mar., 1918.—An expedient method of crossing wheat whereby two sorts are planted close together, head of female plant castrated and enclosed with head of male plant in same stage of development by wrapping the two with paper and tying at both ends. In this way crossed seed and selfed seed of male parent are obtained with little effort and less danger from contamination by undesired pollen. The former practice of castrating and pollinating by hand is compared with this process. In five years tested, hand transfer of pollen gave from 6.6–32.4 per cent of heads with seed and from 1.4–3.9 as the average number of seeds per head. During two years jointly-enclosed heads gave from 46.1–51.0 as the per cent of heads with seed and 2.9–4.6 as the average number of seeds.—*D. F. Jones.*

946. KIHARA, H. **Ueber cytologische Studien bei einigen Getreidearten. Mitteilung I. [Cytological studies on several species of cereals. I.]** Bot. Mag. Tôkyô, 33 (No. 386): 17–38. *21 fig.* Feb., 1919.—The F_1 hybrids between two different species of wheat possessing 14 and 21 chromosomes respectively (diploid!), as, e.g., *Triticum durum* and *T. vulgare*, have $14+21=35$ chromosomes, the species having greater number of chromosomes being used as pollen-plant in these hybridizations. In the heterotypic division of pollen-mother-cells of these hybrids 14 chromosomes derived from father and other 14 derived from mother form 14 bivalent chromosomes as usual, while the remaining 7 derived from father remain univalent, thus making 21 chromosomes in all. Fourteen bivalent chromosomes undergo longitudinal cleavage as usual and wander to two poles to form two daughter nuclei, while 7 univalent ones remain generally for long time in nuclear plate, though they are finally absorbed by normal chromosomes or form extranuclear nucleoli. In F_2 and F_4 individuals 35 or 38 chromosomes were found. Reduction division of embryo-sac-mother-cell seems to take place in same way as that of pollen-mother-cell. In plant produced by back-cross of wheat-rye hybrid by wheat root-cells were examined: some individuals were found to possess 42 chromosomes, while others derived from same parent have only their 38. Author thinks that in wheat-rye hybrid the number of chromosomes increases in successive generations, maximum number being 42.—*S. Ikeno.*

947. KNIGHT, L. J. **Physiological aspects of self-sterility of the apple.** Proc. Amer. Soc. Hortic. Sci. 14: 101–105. 1918.—See Bot. Absts. 1, Entry 964.

948. LITTLE, C. C. **A note on the fate of individuals homozygous for certain color factors in mice.** Amer. Nat. 53: 185–187. Mar.-Apr., 1919.—Writer reports results of determining relative numbers of normal and abnormal fetuses formed when yellow mice are mated *inter se* and when they are mated to mice of another color. In former case, there were 91 normal and 21 abnormal fetuses, in the latter 42 normal and only one abnormal. This is held to support view, already maintained by several students of mice, that the homozygous yellow individuals perish *in utero*, thus accounting for the long-known abnormal ratio of two (dominant) yellows to one non-yellow, in F_2 hybrids of these animals, and the fact that the pure dominant type is not known to occur. Little likewise offers some limited evidence that a similar prenatal mortality occurs among the homozygous embryos of "black-eyed-white" mice.—*F. B. Sumner.*

949. LLOYD, FRANCIS E. **The origination of ascidia under quasi-experimental conditions.** Trans. Roy. Soc. Canada 1^{8}: 71–80. 1918.—Describes ascidia formed in cotton plants grown in small pots and subjected to alternate periods of drought and moisture. Attributes results to mechanical pressure set up in the growing buds by resistance offered to rapidly growing internal parts by indurated outer regions. Characters of incompletely ascidiate leaves consist in foldings, sinuses, concrescences, enations. These malformations are not identical with tomosis but may appear concurrently. There is no evidence for inheritance in the cotton plant except that offered by "cluster" varieties in which concrescences, fasciations and concomitant behaviors are dominant.—*J. Arthur Harris.*

950. Lumsden, D. **Orchid breeding.** Jour. Internat. Gard. Club 2: 203–212. *5 fig.* 1918.—Brief review and discussion of history of orchid breeding and of troubles involved in raising seedlings. Several hybrids upwards of 50 years old, propagated asexually, still retain their original vigor. Author is studying Mendelian inheritance and effect of close-pollination in this family. It is author's firm belief deduced from his own and experiments of others, that various root fungi are necessary to successful growth of orchids, especially seedlings. Probably case of mutual parasitism and not symbiosis. Separate organism is required for each tribe, and often for each genus and even species. Attempts are being made to obtain pure cultures of these orchid fungi. Methods and culture medium are described in detail.—*Orland E. White.*

951. McClelland, T. B. **Influence of foreign pollen on the development of vanilla fruits.** Jour. Agric. Res. 16: 245–251. *Pl. 31–35.* 1919.

952. Pearl, Raymond. **On the mean age at death of centenarians.** Proc. Nation. Acad. Sci. [U. S. A.] 5: 83–86. *1 fig.* Mar., 1919.—Purpose of this paper is to determine with accuracy where deaths at one hundred years or over should be centered in statistical computations. Interval evidence of inaccuracies found in the census data available. By use of a properly graduated mortality table, author arrives at figures 101.7 for whites and 102.0 for negroes.—*Sewall Wright.*

953. Price, J. D. **Report of Director.** Ann. Rept. Georgia Agric. Exp. Sta. 30–31. (1917–1918): 4–18. 1919.—Includes brief statement of breeding results in collards (*Brassica*), tomatoes (*Lycopersicum*) and grapes (*Vitis*).—*G. H. Shull.*

954. Robertson, T. Brailsford, and L. A. Ray. **Experimental studies on growth. X. The late growth and senescence of the normal white mouse and the progressive alteration of the normal growth curve due to inbreeding.** Jour. Biol. Chem. 37: 377–426. *8 fig.* Mar., 1919.—Paper describes normal growth curve of white mice between 4 weeks of age and death from natural causes. The maximum weight was reached at 91 weeks in males, 94 weeks in females. Average duration of life was 110 weeks in males, 103 weeks in females. Close inbreeding was carefully avoided, but progressive decline in rapidity of growth, noted between 1914 and 1917, is attributed to continued breeding within one stock.—*Sewall Wright.*

955. Salisbury, E. J. **Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.** Ann. Bot. 33: 47–79. *20 fig.* Jan., 1919. [See Bot. Absts. 2, Entries 703, 749.]

956. Sô, M., Y. Imai, and Y. Terasawa. **Daikon no hi-Mendel-sei Iden ni tuite.** [**On the non-Mendelian inheritance of Raphanus sativa.**] [In Japanese.] Bot. Mag. Tôkyô 33 (No. 386, Japanese part): 21–30. Feb., 1919.—Results of culture-experiments on two red-rooted Chinese varieties of *Raphanus sativus*. Each of these varieties segregates by self-fertilization into red- and white-rooted plants, the number of latter being nearly equal to, or greater than, that of red. Extracted white plants breed true in later generations, while extracted red plants again segregate into red and white. Red plants crossed with white ones gives both kinds of plants, the number of white being almost equal to, or greater than that of red. Fertilization between two extracted white plants gives only white. Self-fertilization of flowers borne on green branches which are produced on red plant by vegetative segregation gives rise to white exclusively, while that of flowers borne on red branches of the same individual produces both kinds of progeny. When plants differing in intensities of red coloration were selfed or crossed with white ones the number of red plants segregated was, contrary to author's expectation, much greater in the case of less than in that of more intensely colored plants. Authors conclude that the inheritance here mentioned is non-Mendelian, but do not enter into theoretical discussion.—*S. Ikeno.*

957. Stockard, Charles B. **Hereditary deficiencies in the sense of smell.** Science 49: 237–239. Mar. 7, 1919.—Author criticises hypothesis of Glaser [Bot. Absts. 2, Entry

936] that "smell-blindness" (a term used by Blakeslee, unfortunate because anosmia is comparable with *actual* blindness rather than with color-blindness) occurring in "a young Russian Jew, a fugitive from Kiev" is hereditary. Disease, rhinoscleroma, endemic in region of Kiev, and various forms of chronic rhinitis, prevalent among Russian Jews, produce anosmia. Careful studies of environmental conditions are necessary in testing heredity of deficiencies of this sort. It is very probable, however, that defects in sense of smell are in some cases hereditary.—*P. W. Whiting.*

958. STOMPS, THEO. J. **Vergrünung als parallele Mutation. [Virescence as a parallel mutation.]** Rec. Trav. Bot. Neerlándais 15 (1918): 17–26. *1 table, 1 fig.* 1919.—In preceding paper author has mentioned occurrence of same mutation in different species of *Oenothera* and has called this phenomenon "parallel mutation." A new case of parallel mutation is here described. Several years ago de Vries observed a mutant of *Oenothera Lamarckiana*, which showed virescence and same mutation was found by author in 1917 in cultures of *Oenothera biennis*. The mutant plant was quite sterile and had groups of little leaf-bearing branches instead of flowers. Apex of smallest leaves of these branches was often curled up and this is considered by author as indication that they were destined to become stamens. Some leaves were divided and branches often showed fasciation. Number of chromosomes of mutant plant proved to be 14, like that in original *Oenothera biennis* and author was unable to observe disappearance of parts of chromosomes, as Delaunay had observed in sterile forms of *Muscari*. Occurrence of forked leaves and fasciated branches leads author, in opposition to de Vries and Worsdell, to consider fission of leaves not as incipient form of fasciation but as first step towards reappearance of dichotomous branching of lower plants.—*Tine Tammes.*

959. STRAMPELLI, N. **Genealogia del frumento Carlotta Strampelli. [Genealogy of the grain Carlotta Strampelli.]** Atti R. Accad. Lincei, Rend. V, Cl. Sci. Fis., Mat. e Nat. 27^2: 131–135. *Fig. 1–4.* 1918.

960. VAN HERWERDEN, M. A. **Untersuchungen über die parthenogenetische und geschlechtliche Fortpflanzung von Daphnia pulex. [Researches on parthenogenetic and sexual reproduction of Daphnia pulex.]** Versl. Koninkl. Akad. Wet. Amsterdam, 20^2: 1. 1918.—The descendants of a parthenogenetic specimen of *Daphnia pulex* cultivated and pedigreed in the laboratory, from January, 1910 until December, 1917. Cultures were kept at room, cave, and brood-stove temperature (the water temperature of latter cultures varying between 12° and 18°C.—This cultivated stem of *Daphnia pulex* maintained, notwithstanding the altered condition of life, during these 8 years, the monocyclic characters it showed in nature. Controls have been taken during a year from the ditch where the Daphnias originated. While in the natural habitat only ephippial eggs survived during the winter months, in laboratory a part of the animals continued parthenogenetic method of reproduction. In this way a set of parthenogenetic generations without introduction of an ephippial egg has been cultivated from January 1910 till February 1916. It has been demonstrated that every autumn many room, cave, and brood-stove cultures commenced in the same time the sexual method of reproduction and it is notable that this simultaneous beginning of the sexual wave took place in *Daphnia* with quite diverging position in the pedigree, e.g., October 29, 1916 in two cultures diverging from the general stock since the winter 1912. This gametogenesis appeared as well in the first as in the later broods, as well in isolated individuals as in mass cultures. In many ways it has been tried to influence gametogenesis artificially, as in Woltereck's cultures of *Daphnia*. A sudden cooling of eggs in their last ripening period often gave rise to males, but only in a period of lability of the sexual and asexual tendencies. Also a preinduction has been observed, namely asexual differentiations of grandchildren after exposing ripening eggs of the grandmother during 24 hours. A radiation with radium or ultraviolet rays in sensible period of ovary has no influence on method of reproduction. Food changes did not affect sex in any way, nor did treatment with many different chemicals. Has one to conclude that continuations of this rhythmic mode of reproduction—continued notwith-

standing changed conditions of life in the laboratory—has been fixed in the genotype? Or must one accept autumnal influences working as well in the laboratory as in nature, but escaping observation?—The cultivated stems of *Daphnia pulex* showed no degenerations in the 8 years' culture. Temporary depressions have been restored by additions of traces of cyanhalin, manganochlorid and other substances. With yeast feeding also good results have been obtained. Variability as to the outer appearance proved to be very great in the cultivated stems of *Daphnia pulex;* but the only definite morphological change observed during these 8 years was the vanishing of the dorsal chitinous teeth which characterized during the first year of culture the greater part of the new-born *Daphnia.*—In a separate set of experiments with constant temperature it has been demonstrated that between 10° and 20°C. the embryonic development of *D. pulex* follows in broad lines the law of van't Hoff about temperature coefficients.—*M. A. van Herwerden.*

961. van Herwerden, M. A. **Effects of the rays of radium on the oögenesis of Daphnia pulex.** Versl. Koninkl. Akad. Wetensch. Amsterdam 21^4: 1919.—Egg-cells of *Daphnia pulex* are most susceptible to radium radiations in the last stage of maturation. The resisting power increases during embryonic development. In one and same brood individual difference of susceptibility to rays of radium is frequently noted. The egg that resists deleterious influence often develops into perfectly normal animal, which becomes fertile. Rare specimens with morphological anomalies seldom become adults. Only once from such an abnormal young a stock without morphological changes has been raised.—Long-continued radiations from 0.7 milligram radium bromide does not endanger life of sexually mature *Daphnia,* but only its fertility. It depends on the duration and strength of radiations whether only maturing eggs, oöcytes, or also oögonia, are injured. Large progenies being easy of observation afford an opportunity to study this in every special case. Prior to maturation *Daphnia* resists radium radiations for long time. Only after a sojourn of many hours in the capsule with 0.7 milligram of radium bromide the future ripening of the oögonia is also endangered.—Microscopic examination of the ovary and embryos reveals that deleterious effect of radium manifests itself only toward close of blastula stage by abnormal behavior of the chromatin, as when the egg cells were affected when lying still in the ovary.—If the beta-rays are eliminated through filtrations, deleterious effect of radium is arrested or highly diminished, which proves beta-rays to be mainly responsible for destruction of the eggs.—*M. A. van Herwerden.*

962. White, Orland E. [Review of: Harwood, W. S. **New creations in plant life.** New York, 1918.] Torreya **19:** 15–17. 1919.

963. Ziegler, H. E. **Die Vererbungslehre in der Biologie und in der Soziologie, ein Lehrbuch der naturwissenschaftlichen Vererbungslehre und ihrer Anwendungen auf den Gebieten der Medizin, der Genealogie und der Politik, zugleich 2 Aufl. der Schrift über die Vererbungslehre in der Biologie. Zehnter (Schluss) Teil des Sammelwerkes "Natur und Staat." [Genetics in biology and sociology, a text-book of genetics and its applications in the fields of medicine, genealogy and political science, being the 2nd edition of the work on "Genetics in biology" and tenth (concluding) part of the general work "Nature and the State".]** *xvi+479 p., 8 partly colored pl., 114 fig.* Gustav Fischer, Jena, 1918.—Author first considers chromosomes and their reduction, which he holds completely explain results of experimental genetics. Theory of human heredity must be based on general biological theory of heredity. Discusses significance of doctrine of hereditary factors for disease and malformations. Section dealing with problems of sociology and political science is new and author incorporates here pertinent conclusions from biological facts; he treats heredity of psychical traits including defects and mental disorders, natural dissimilarities of men; social inequality (social contracts, private property, natural gifts and social position, origin of social rank, the inferior, criminal); origin of family and state (zoological view, false doctrine of Rousseau, etc.); parliamentary government. [See also Bot. Absts. 2, Entry 923.]—*J. P. Kelly.*

HORTICULTURE

J. H. GOURLEY, *Editor*

964. BURKHOLDER, C. L. **Horticultural extension work in Indiana.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 56–59. 1919.—An outline is given of the methods pursued in carrying on horticultural extension work in Indiana. The work consisted principally in demonstration work in orchards, orchard club work, winter short course schools, landscape work, vegetable gardening, and exhibit work.—*J. H. Gourley.*

965. CLOSE, C. P. **Extension service in pomology in the United States Department of Agriculture.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 49–52. 1919.—An outline is given of the extension work which is being carried on by the U. S. Department of Agriculture. These activities consist in extension schools and field demonstrations, which cover practically every line of pomological work.—*J. H. Gourley.*

966. DARROW, GEORGE M. **Strawberry culture: South Atlantic and Gulf Coast Regions.** U. S. Dept. Agric. Farmers Bull. 1026. P. 1–40. *Illust.*—A discussion is given of the culture of the strawberry in the South Atlantic and Gulf Coast regions. Methods are recommended for the production and marketing of the fruit.—*J. H. Gourley.*

967. DARROW, GEORGE M. **Strawberry culture: Western United States.** U. S. Dept. Agric. Farmers Bull. 1027. P. 1–29. *Illust.*—A popular discussion is given on the standard methods of strawberry culture in the western United States.—*J. H. Gourley.*

968. DORSEY, M. J. **Hardiness in top-worked varieties of the apple.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 38–45. *1 fig.* 1919.—A discussion is given of the nature of frost injury and winter injury of various fruits. The degree of browning of the wood is considered a most sensitive index of the winter injury which occurs to fruit trees. On this basis cuts were made into the limbs, three to five annular rings deep, and a classification of hardiness was made under the headings, no injury, slight brown, brown and dark brown. Such hardy varieties as Oldenburg, Wealthy and Patten Greening were slightly injured in the winter of 1916–17 and even Hibernal, which is generally recommended as a stock was slightly injured. The Tompkins King, Hubbardston, Jonathon and Delicious, judging from this test, did not prove to be sufficiently hardy for Minnesota conditions. It is noted that relatively hardy stocks did not prevent the more tender varieties from being injured. In no case was the degree of injury of a given variety widely different on two or more different stocks.—The same observations were made for the succeeding winter, 1917–18 when the injury to apple trees in Minnesota was more extensive than for several years. It was concluded that many of the standard varieties of apples of the Eastern States approach the limit of their range in Minnesota.—The injury to the apple is generally more severe than is indicated by the amount of killing back of the twigs; the smaller branches and limbs show less browning of the wood than does the trunk; the hardiness of the cion is independent of that of the stock; and, if the stock exerts any influence on the cion it is so slight that no protection is afforded the more tender variety, are the conclusions of the article.—*J. H. Gourley.*

969. GUNDERSON, A. J. **The pruning of winter-injured peach trees.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 32–38. 1919.—Serious injury occurred to peach trees in southern Illinois. The appearance of the trees and conditions under which they suffered most are described. The Hale was injured more than the Elberta when growing under similar conditions.—Some experiments showed that light to moderate pruning was the most advantageous in the recovery of the tree of any practice followed in the text. Dehorning usually resulted in the death of the tree. Waxing the cut surfaces proved of no value. One pound of nitrate of soda per tree aided in recovery.—*J. H. Gourley.*

970. MACOUN, W. T. **Winter injury in Canada.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 13–17. 1919.—There have been seven winters in the past sixty years in which serious winter

injury has occurred in the Provinces of Ontario and Quebec, viz. 1858–59, 1876–77, 1884–85, 1895–96, 1898–99, 1903–04, and 1917–18. The most severe winters in the past twenty years were those of 1903–04 and 1917–18, and in neither winter was there any root-injury noted as the ground was well protected by snow. These two winters were quite similar in degree of cold, time of greatest severity of cold and in the ground protection of snow. The season of 1917 was a short growing season which was not true, however, of 1903.—In 1903–04 there were 306 apple trees including 164 varieties killed in the orchards of the Experimental Farm, Ottawa, while in 1917–18 there were 360 trees killed, including 200 varieties. In determining the exact time of the winter (1917–18) when the injury occurred data are offered which show that of 885 grafts made from cions cut December 5 and 6, 1917 on seedlings of Orion Crab, 559 or 63.16 per cent grew, while from 607 grafts made from cions cut February 13, 1918, 112 or 18.45 per cent grew, thus indicating the period when the wood was injured. This is in contrast with 1916–17 when 86.03 per cent of the grafts grew. Also by observing how low down on the trunks the injury occurred it appeared that the freezing took place early in the winter before a large amount of snow fell.—Injury to nursery stock was also very great. Notes were made on 300 varieties as to the degree of injury which occurred and they showed that of 11 per cent of the varieties which did not kill back at all 60 per cent were crab apple hybrids. The observation is also made that trees of the hardier varieties which were killed had borne a good crop in 1917. Data are given to establish this observation with the Wealthy. —While nearly all the domestica plums were killed or badly injured, few of the American sorts were hurt and they had a good crop in 1918. Russian pears and Morello cherries were killed or injured.—*J. H. Gourley.*

971. Marshall, Roy E. **Establishing the orchard.** Virginia Polytech. Inst. Ext. Bull. 41. *19 p., illust.*—Popular.

972. Oskamp, Joseph. **Winter injury in Indiana.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 25–30. 1919.—The winter of 1917–18 was the first on record that apple trees in Indiana suffered generally from low temperatures. Young trees, ranging in age from 3 to 14 years suffered most with a loss for the state of about 3 per cent, while old orchards suffered less.—Orchards in low spots suffered most, and there was a striking variation in hardiness of varieties. Baldwin, Stayman Winesap, Ben Davis, Northern Spy, York Imperial and Jonathon suffered most in about the order named. Northwestern Greening and Delicious were entirely uninjured. The nature of the previous season was cold and wet and such as to result in improper maturity of the wood, and this together with the earliness of the cold weather contributed to the cause of the severe injury. Trees which were weakened from any cause suffered most from winter injury.—Peach trees were severely injured, especially the older trees. The acreage of bearing trees has been reduced about sixty per cent from this cause. Experiments were conducted in orchards which suffered from winter injury to determine the best methods of aiding their recovery. The treatments involved checks, light, moderate and heavy pruning, and dehorning, as well as fertilizer tests. The outstanding results of the pruning work were the disastrous results of heavy cutting and dehorning when the trees were dormant but when done in full leaf the results were successful. Late moderate pruning seems to be the most desirable method of treating the injured trees.—By applying two pounds of nitrate of soda to a 6-year-old tree the growth was greater and the foliage was maintained on the trees for a longer time than on the check trees.—*J. H. Gourley.*

973. Rees, R. W. **Extension work in pomology in New York.** Proc. Amer. Soc. Hortic. Sci. 15 (1918): 53–56. 1919.—The three main lines of work which received the attention of the extension specialist in horticulture in New York for the past year were pruning demonstrations, demonstration schools and conferences in regard to central packing houses.—*J. H. Gourley.*

974. Sutton, F. J., and H. R. Niswouger. **The home vegetable garden.** Kentucky Agric. Coll. Ext. Circ. 67. *43 p. Illust.*—A discussion is given of the development of the

home garden, dealing particularly with preparation and fertilization of soils, selection of varieties and planting distances of the crops, insect and fungous diseases affecting the crops with control measures, together with methods of practical home storage.—*J. H. Gourley.*

975. WOOLSEY, C. **Strawberry culture.** Virginia Polytech. Inst. Ext. Bull. 36. *16 p. Illust.*—Popular.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

976. BUGNON, P. **Sur une nouvelle méthede de coloration élective des membranes végétales lignifiées. [A new method for selective staining of lignified tissues.]** Compt. Rend. Acad. Sci., Paris, **168**: 62–64. 1919.—Author advocates the use of "Lichtgrün" as a differential stain for lignified tissues. Excellent results were obtained through the use of saturated solutions, both aqueous and alcoholic, acidulated by means of HCl or acetic acid. Simple washing with water removes the stain from all but lignified tissues and by combining "Lichtgrün" and Sudan III (alcoholic) a double stain differentiating suberized and cutinized tissues from lignified tissues is obtained. Promising triple combinations were made using "Lichtgrün," ammoniacal Gentian Violet, Sudan III, etc. The use of "Lichtgrün" instead of phloroglucine allows the use of hypochlorite of soda for the removal of the cell contents.—*V. H. Young.*

977. GROOM, PERCY. **The wood of Tetracentron Trochodendron, Drimys and other types.** Ann. Bot. **33**: 133. 1919.—A note explaining that Messrs. Bailey and Thompson had erroneously attributed to the author an expression of the view that these types are descended from a form which possessed wood vessels.—*W. P. Thompson.*

978. HAYDEN, ADA. **The ecologic foliar anatomy of some plants of a prairie province in central Iowa.** Amer. Jour. Bot. **6**: 69–85. *Pl. 9–14.* 1919.—A brief statement is presented of the views of previous workers as to the importance and effect of environmental conditions on the structure of the leaf. The leaves of 28 species, characteristic of various habitats, are then described as to orientation, arrangement, gross structure and histology; and their features are compared. The presence in the leaves of these prairie plants of a specialized palisade tissue, a thick-walled and trichomeless epidermis, water-storing tissues, and sometimes of trichomes, indicates their xerophytic tendency. The writer points out that it is not the presence of any of these characters alone, but rather their correlation with other features of the plant, which is of primary importance as an indication of xerophytism.—*E. W. Sinnott.*

979. MACCAUGHEY, VAUGHAN. **The Pala or Mule's-Foot Fern (Marattia Douglasii (Presl) Baker) in the Hawaiian Archipelago.** Torreya **19**: 1–8. 1919.—This fern is the sole representative in the Hawaiian Islands of the Marattiales. This order, abundant in early geologic periods, is at present represented by 6 genera and some 50 species, distributed through the tropics of both hemispheres, Hawaii forming the northernmost limit of its range. The occurrence of *Marattia Douglasii* in the Hawaiian Islands may be explained in three ways: (1) Introduced by natural means from the South Pacific; (2) Deliberately introduced by the natives as a food-plant; (3) Persisting as a survival of an earlier flora. This species is called *pala* by the Hawaiians, and is found somewhat sparingly through the humid zone of both windward and leeward slopes, between 800 and 3500 feet. The gross structure is described in detail. Campbell's study of the gametophytes is summarized. The fern does not occur in cultivation, but deserves attention. The name "mule's-foot fern" is proposed, in allusion to the enlarged leaf-base with the two thick fleshy stipules. These stipules were formerly baked and used as food, and were also used medicinally, and to make an agreeable drink. —*J. C. Nelson.*

980. PAVILLARD, J. **Sur la fleur femelle des Ruscus. [Concerning the pistillate blossom of Ruscus.]** Compt. Rend. Acad. Sci. Paris **168**: 113–115. *Fig. 1–4.* 1919.—A brief review of the literature dealing with the morphology of the ovule of *Ruscus* is followed by a short discussion of original observations on the pistillate flowers of *Ruscus aculeatus* and *Ruscus hypophyllum* var. *hypoglossum.* Ovules are shown to be anatropous, with the same general organization as is found in the lily (*Lilium*). The inner integument protrudes beyond the outer integument at the mycropylar end, forming the opening of the mycropyle.—In *R. aculeatus* the ovule is completely surrounded by a layer of lignified cells with scalariform thickenings, similar to that described by Treub in 1891 for *Casuarina.*—*V. H. Young.*

981. WILLIAMS, KATHERINE A. **A botanical study of skunk-cabbage, Symplocarpus foetidus.** Torreya **19**: 21–29. *Pl. 1–2, fig. 1–13.* 1919.—The range and dates of flowering of this species are described. The odor, which suggests fresh cabbage with a touch of mustard, varies widely, and is stronger in plants with ripe stamens. The early growth of the plant is described in detail. Attention is called to the double spathe in some plants. The color of the spathe varies from deep purplish-red to pale yellowish-green, usually mottled with purple. This variation in color does not seem to be due to age, as Reed has suggested, for out of 50 plants examined, withering and decay were not limited to the darker ones; nor does it seem to depend on water-content of the soil, as both colors occur side by side. The variation of flower-clusters in size and in number of flowers is shown by a table. Due to crowding, the parts of the flower are most often in fours instead of threes, and the flowers are almost cuboidal in shape. The stigma is three-lobed but the ovary is one-celled. Some specimens showed flowers with six stamens and six perianth-segments, others with the parts in fives, others with four stamens and six perianth-segments. The color and odor attract flies, which are useful in pollination. The process of germination is fully described. The plant probably does not produce flowers till the fourth year. The plants develop more rapidly in warm light places. The leaves show a transition toward netted-veining, especially under dry conditions. Microscopically they show rhaphides and other crystals. The juice is very bitter and acrid, but loses this property in boiling. The root-system is very large, the central rootstock being almost the size of a potato.—*J. C. Nelson.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

982. DENIS, MARCEL. **Sur quelques thalles d'Aneura depourvus de chlorophylle. [Concerning certain thalli of Aneura devoid of chlorophyll.]** Compt. rend. Acad. Sci. Paris **168**: 64–66. *Fig. 1–2.* 1919.—The recent discovery of a species of *Aneura* devoid of chlorophyll, in the Départment of Saône-et-Loire, France, is recorded. The thalli are fleshy and generally sterile, resembling the coralloid roots of certain saprophytes. The presence of an endophytic fungus consisting of "balls" of rarely branched hyphae in the lower parts of the thallus and in the thizoids was demonstrated by means of differential stains. *Aneura pinguis,* which contains chlorophyll, also harbors an endophytic fungus but never to the extent noted in the chlorotic *Aneura.* The fungus appears to replace chlorophyll both morphologically and physiologically, reducing the thallus to a purely saprophytic condition. The two forms of *Aneura* are compared to the gametophytes of *Lycopodium. L. inundatum* and *L. cernuum* contain chlorophyll and may be compared with *Aneura pinguis,* while the chlorotic *Aneura* may be compared with the gametophyte of *L. Selago* or *L. Phlegmaria.* The numerous questions raised by the association of the chlorotic *Aneura* and the endophyte are not answered.—*V. H. Young.*

983. DIXON, H. N. **"Chatubinskia" a further correction.** Bryologist **21**: 80–81. 1918.—It is shown that this name should properly be "*Chalubinskia,*" since it was given in honor of Professor Chalubinskia, of Warsaw.—*A. W. Evans.*

984. HAYNES, CAROLINE C. **Sullivant Moss Society exchange list of Hepaticae found in the United States, Canada, and Arctic America.** Bryologist **21**: 87–90. 1918.—A check list

of 438 species belonging to 96 genera. The sequence of the genera is according to the Engler and Prantl system.—*A. W. Evans.*

985. LORENZ, ANNIE. **Notes on Radula obconica Sull.** Bryologist 21: 56–59. *Pl. 25.* 1918.—The history of this endemic American species is reviewed, a full description is given, and a list of specimens (ranging from Vermont to North Carolina and westward to Arkansas) is added. Attention is called to the vegetative reproduction by means of caducous leaves, previously reported in a single Brazilian species of *Radula.* The figures illustrate clearly the general habit of the plant and its essential structural details.—*A. W. Evans.*

986. PEARSON, WILLIAM HENRY. **The genus Herberta as represented in the Manchester Museum.** Jour. Bot. 57: 42–44. 1919.—Localities are given for the twenty species represented in the Museum; also critical notes on *H. adunca* (Dicks.) S. F. Gray, *H. Hutchinsiae* (Gottsche) Evans (recently separated by A. W. Evans), and a few other species.—*K. M. Wiegand.*

987. PENNELL, FRANCIS W. **Concerning duplicate types.** Torreya 19: 13–14. 1919.

988. RILSTONE, F. **Cornish mosses and hepatics.** Jour. Bot. 57: 3–10. 1919.—Records are given from the eastern half of Vice-County 1 (West Cornwall) and from the drainage area of the Fowey and Looe Rivers in Vice-County 2 (East Cornwall). These include definite stations for most of the mosses and hepatics listed, the mosses representing 47 genera and the hepatics, 32. There are also brief notes on habitat, frequency, morphology and taxonomy. The whole is prefaced by a few paragraphs on the soil of the region, and the abundance of the bryophytic flora.—*K. M. Wiegand.*

989. WARNSTORF, C. **Übersicht der europäischen gelapptblättrigen Arten der Gattung Jungermannia L. p. p. oder Lophozia Dum. [Synopsis of the European species with lobed leaves of the genus Jungermannia L. in part or Lophozia Dum.]** Hedwigia 60: 53–84. March 15, July 10, 1918.—The author objects strongly to discarding the old generic name *Jungermannia* and advocates that it be retained for the species with lobed leaves, which many writers now refer to Dumortier's genus *Lophozia.* He discusses the European species by means of an extensive key, arranging them in the three groups *Bilobatae, Diversilobatae* and *Trilobatae.* Critical remarks, mostly in the form of footnotes, are added, and a new species, *J. kerguelensis* Warnst., from the island of Kerguelen is incidentally proposed. The European species recognized are for the most part those included in Müller's Lebermoose, but a few forms, such as *J. cylindracea* Dum. and *J. porphyroleuca* Nees, are given specific rather than varietal rank, and a few changes in specific names are advocated.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, BACTERIA AND MYXOMYCETES

E. W. OLIVE, *Editor*

990. ATKINSON, GEO F. **Relationships within the Rhodosporeae.** Bot. Gaz. 67: 266–267. 1919.—Two distinct phyletic lines are recognized among the rosy-spored Agarics, distinguished in part by the presence of numerous internal cystidia in the lamellae of group one (*Pluteus* and *Volvaria*), and by their absence in group two (*Entoloma, Leptonia, Clitopilus, Eccilia, Nolanea,* and *Claudopus*).—*E. W. Olive.*

991. BURNHAM, STEWART H. **Charles Horton Peck.** Mycologia 11: 33–39. *Fig. 1.* 1919.

992. COLLEY, REGINALD H. **Parasitism, morphology and cytology of Cronartium ribicola.** Jour. Agric. Res. 15: 619–659. *Pl. 48–59.* 1918.—The paper deals particularly with the minute histology of the organism in all stages of its life history, and with the cytological phenomena exhibited in spore production in the various types of sori. The development and morphology of the pycnium, aecium, uredinium and telium are outlined in considerable detail, the ontogeny of peridia and spore chains being carefully followed. The relation of the

fungus to its hosts is discussed, and special attention is directed to the haustoria. These structures are abundant, and the most important elements of the mycelium from the diagnostic standpoint. Each haustorium is enclosed in a definite sheath which is thicker at the tip and base than at its sides. A theoretical explanation of this condition is advanced.—The nuclear history of the species is traced throughout all stages, and agrees in the main with that described for other rust fungi. Multicellular fusions at the base of the aecium are, however, of common occurrence. Since the number of polynucleate aeciospores is relatively small it is concluded that either the supernumerary nuclei in the basal cell degenerate or the basal cell gives rise to more than one chain of binucleate spores. Nuclear division is shown to be a true mitosis, and the haploid number of chromosomes is regarded as probably eight. The first division in the promycelium differs in appearance from other divisions in the life history and is regarded as the heterotypic mitosis.—Certain interesting abnormalities were observed. Aecia with reversed polarity having the chains of spores growing entad have been seen. Aecia have also been observed on the roots under several inches of loam. Double pycnial layers are not uncommon. Internal uredinia and telia also occur. All these phenomena are regarded as teratological.—The author describes in considerable detail the methods used by him in the investigation. In the preparation of minute objects such as aeciospores and telial horns for sectioning he found the use of a centrifuge advantageous. A method for imbedding such material in paraffin while in the centrifuge is described.—The paper is extensively illustrated with drawings and photomicrographs.—*H. M. Fitzpatrick.*

993. Denis, Marcel. **Sur quelques thalles d'Anéura dépourvus de chlorophylle.** [Concerning certain thalli of Aneura devoid of chlorophyll.] Compt. Rend. Acad. Sci. Paris 168: 64–66. *Fig 1–2.* 1919.—See Bot. Absts. 2, Entry 982.

994. [Dodge, B. O.] Anonymous. **Index to American mycological literature.** Mycologia 11: 47–50. 1919.

995. Drechsler, Charles. **Morphology of the genus Actinomyces.** I. Bot. Gaz. 67: 65–83. Same title. II. *Ibid.* 67: 147–168. *Pl. 2–9.* 1919.—Of the probably more than 100 species examined by the author, he selects 18 for critical study of cultural and morphological characteristics. These 18 are designated by Arabic numerals and four of them are referred to previously described species, *Actinomyces XVII* being the potato scab organism, *A. scabies* (Thaxter) Güssow. Notwithstanding the minuteness of the filaments of *Actinomyces* (the diameter ranging commonly from 0.5–1.2μ), which has been apparently primarily responsible for its inclusion by most recent writers among the bacteria, the author regards the characters (the production of aerial spores, abundant branching, the appearance of vacuoles in the protoplasm, the presence of granules in the spores of many species which possess the staining properties of nuclei) as fungoid, and hence would place *Actinomyces* among the Hyphomycetes, as a mucedinous group with tendencies toward an Isarioid habit. Sporogenesis begins at the tips of the fertile branches and proceeds basipetally. The sporogenous hyphae of most species are coiled in peculiar spirals, which exhibit pronounced specific characteristics in the number, diameter, and obliquity of their turns, and especially in the direction of rotation, 11 species having sinistrorse branches, 5 dextrorse, 1 uncertain. Two tendencies in the development of the spore-bearing fructifications are recognizable (the majority of species also show intermediate tendencies): one, an erect dendroidal type, in which the sequence of sporogenesis is successive; the other, leading to a prostrate, racemose type in which sporogenesis is more nearly simultaneous. The plants were grown usually on potato or glucose agar. For permanent preparations, some of the agar bearing the fungus was cut off and applied firmly to slides smeared with albumen fixative, then carefully removed so as to transfer the mycelium from the agar surface to the slide; followed by fixation, staining (preferably with Delafield's haematoxylin), and mounting in balsam. [See Bot. Absts. 2, Entry 58.]—*E. W. Olive.*

996. Durand, Elias J. **Peziza proteana var. sparassoides in America.** Mycologia 11: 1–3. *Pl. 1.* 1919.—This variety is described and contrasted with *Peziza proteana;* the chief

differences noted are the larger size, greater complexity of masses and extreme brittleness of the flesh. The author believes this to be the same as *Gyromitra Phillipsii* Mass.—*H. R. Rosen.*

997. Fromme, F. D., and T. J. Murray. **Angular leaf spot of tobacco, an undescribed bacterial disease.** Jour. Agric. Res. 16: 219–228. *Pl. 25–27.* 1919.—See Bot. Absts. 2, Entry 1035.

998. Hemmi, Takewo. **Vorläufige mitteilung über eine neue anthraknose von Evonymus japonica.** [**A new anthracnose of E. japonica.**] Ann. Phytopath. Soc. Japan 1: 9–15. 1918.—See Bot. Absts. 2, Entry 1040.

999. Levine, Michael. **The sporadic appearance of non-edible mushrooms in cultures of Agaricus campestris.** Bull. Torrey Bot. Club 46: 57–63. *Pl. 3–5.* 1919.—Visits to the beds of many commercial mushroom growers made possible a study of various non-edible forms which appeared. Those discussed are: *Panaeolus venenosus* Murrill, *P. campanulatus* L., *P. retirugis* Fr., *Clitocybe dealbata* Sow., *Tricholoma melaleucum* Quel., *Peziza domiciliana* Cooke—*P. A. Munz.*

1000. Lister, G. **Two new varieties of Lamproderma.** Jour. Bot. 57: 25–27. *Pl. 552.* 1919.—*L. violaceum* (Fries) Rost., var. *debile* G. Lister and Howard, and *L. atrosperum* Meylan, var. *anglicum* G. Lister and Howard described as new; both obtained by H. J. Howard in Whitlingham Woods near Norwich, England. Curious crystalline, rod-like structures, scattered over the sporangia of the former species, are discussed.—*K. M. Wiegand.*

1001. McDougall, W. B. **Development of Stropharia epimyces.** Bot. Gaz. 67: 258–263. *Fig. 1–10.* 1919.—This mushroom, parasitic on *Coprinus*, follows in its mode of development that described for the group including *Agaricus campestris* and other forms, in which the hymenophore primordium appears first, pileus and stem being differentiated later. *Stropharia* and *Agaricus* are therefore closely related genera. [See Bot. Absts. 2, Entry 736.] —*E. W. Olive.*

1002. Murrill, William A. **Cuban polypores and agarics.** Mycologia 11: 22–32. 1919. —A list of 151 recognizable and 5 doubtful species of Polyporaceae and 192 recognizable and 4 doubtful species of Agaricaceae, together with the substrata or hosts, is presented.—*H. R. Rosen.*

1003. Anonymous. [Murrill, W. A.] [Rev. of: Burt, E. A. **Merulius in North America.** Ann. Missouri Bot. Gard. 4: 305–362. *Pl. 20–22, fig. 1–39.* 1917.] Mycologia 11: 45–46. 1919.—Reviewer commends Dr. Burt's article and presents Dr. Murrill's field notes on *Merulius hirsutus.*—*H. R. Rosen.*

1004. Parks, H. E. **Notes on California fungi.** Mycologia 11: 10–21. 1919.—Field data, especially habitat, on various Hymenomycetales and hypogaeous fungi are presented. Some of these are believed to be new species.—*H. R. Rosen.*

1005. Paulson, Robert. [Review of: Smith, Annie Lorrain. **A monograph of British lichens: A descriptive catalogue of the species in the department of botany, British Museum. Part I.** 2nd ed. *519 p. 71 pl., 11 fig.* Printed by the Museum. 1918.] Jour. Bot. 57: 21–23. 1919.

1006. Pennell, Francis W. **Concerning duplicate types.** Torreya 19: 13–14. 1919.

1007. Saunders, James. **The Mycetozoa of Bedfordshire.** Jour. Bot. 57: 63–65. 1919.— A list of the species found, with localities and some habitats.—*K. M. Wiegand.*

1008. Smith, Annie Lorrain. **A monograph of British lichens: A descriptive catalogue of the species in the department of botany, British Museum. Part I.** 2nd ed. *519 p., 71 pl., 11 fig.* Printed by the Museum. 1918.—Rev. by R. Paulson in: Jour. Bot. 57: 21–23. 1919.

1009. Stakman, E. C., and M. N. Levine. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–47. 1919.—See Bot. Absts. 2, Entry 1081.

1010. Stevens, F. L., and Nora E. Dalbey. **New or noteworthy Porto Rican fungi.** Mycologia 11: 4–9. *Pl. 2–3.* 1919.—Two new genera, *Septoriopsis* and *Wageria*, are described with *S. Chamaesyceae* and *W. portoricensis* as the type species, the former genus belonging to the Tuberculariaceae-Scolecosporae and the latter to Perisporiaceae-Phaeodidymae. The following seven other new species are described: *Septoriopsis Piperis, Exosporium Leucaecae, Ramularia Mimosae, Haplographium portoricense, Microclava Coccolobiae, Mycosphaerella subastoma, Stephanoma Melioliae.—H. R. Rosen.*

1011. Vincens, F. **Quelques maladies des plantes cultivées au Parà (Brésil). [Some diseases of the cultivated plants of Para, Brazil.]** Bull. Soc. Path. Veg. France 5: 45–55. *Fig. 1–5.* 1918. See Bot. Absts. 2, Entry 1093.

1012. Williams, R. S. **Notes on some western lichens.** Bull. Torrey Bot. Club 46: 21–25. 1919.—A report is made on a collection of lichens made in the Yukon region in 1898 and 1899, and on one made in Montana in 1897. Various species are listed and corrections made of the reports published by others on the same material.—*P. A. Munz.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

1013. MacCaughey, Vaughan. **The pala or mule's-foot fern (Marattia Douglasii (Presl) Baker) in the Hawaiian Archipelago.** Torreya 19: 1–8. 1919.—See Bot. Absts. 2, Entry 979.

1014. Scott, D. H. **On the fertile shoots of Mesoxylon and on the allied genus.** Ann. Bot. 33: 1–21. *Pl. 1–3, fig. 1–3.* 1919.

PATHOLOGY

Donald Reddick, *Editor*

1015. Åkerman, Å. **Iakttagelser rörande stråfusariose på vårvete sommaren 1917. [Specific resistance of different varieties of spring wheat to Fusarium culmorum.]** Sveriges Utsädesf. Tidskr. 28: 82–89. 1918.—Spring wheat in southern and central Sweden suffered severely in 1917 from attacks by *Fusarium culmorum.* This was due to (1) infested seed developed in the damp, rainy weather of the preceding harvest and (2) the great drought in the spring of 1917 which weakened the seedlings and made them more susceptible. Nine varieties are named, by number, which possessed immunity or resistance and 5 which were especially susceptible.—Differences in susceptibility were confirmed by numerous controlled experiments. The cause of the difference is not known, but there is no relation between earliness of maturity and susceptibility. Possibly it is due to the structure of the flower or the presence of substances toxic to *Fusarium.* [From abst. in: Internat. Rev. Sci. and Pract. Agric. 9: Entry 1297. 1918.]—*D. Reddick.*

1016. Anonymous. **Wart disease of potatoes.** Rept. Bd. Agric. Scotland (1917) 6: lx–lxii. 1918.—Potato wart (*Chrysophlyctis*) was reported from twice as many gardens and farms as in 1916. Use of poor planting stock, and use of infested land, under the war stimulus, are thought to account for this; also the variety Arran Chief, a very susceptible variety, was planted extensively.—According to law, license must be secured before infested land may be planted to potatoes and only resistant varieties may be used. A list of such varieties is mentioned.—*D. Reddick.*

1017. Anonymous. **American gooseberry mildew.** Rept. Bd. Agric. Scotland (1917) 6: lxii. 1918.—"The practice of dipping bushes in a solution of lime-sulfur solution before

despatch to customers, which the Board recommended last year to occupiers of infected nurseries, has been found to be very efficacious in preventing the spread of the disease from these premises."

1018. Arnaud, G. **Le mildou des lilas et la maladie des cotylédons d'érable. [The lilac mildew and a disease of maple cotyledons.]** Bull. Soc. Path. Veg. France 5: 58–60. 1918.—*Phytophthora syringae* is reported as occurring at the Pathological station in Paris. *Botrytis cinerea, Heterosporium syringae, Cladosporium herbarum* and *Dematium pullulans* are also reported on the same host. *Cercosporella acerina* attacks cotyledons of *Acer* sp. causing brown spots and final decay.—*C. L. Shear.*

1019. Averna Saccá, Rosario. **Exame microscopico das jaboticabas enviadas pela directoria de agricultura. Ferrugem das jaboticabeiras. [Rust of jaboticaba.]** Bol. Agric. São Paulo 19: 68–69. 1918.—*Uredo* sp. found on leaves of jaboticaba [*Myrciaria jaboticaba?*]. One or two treatments with bordeaux mixture should give control. Cultural practices that will aid in control are good air drainage and fertilization with phosphate to increase vigor of host.—*D. Reddick.*

1020. Averna Saccá, Rosario. **Molestia das viderias. [Diseases of grapes.]** Bol. Agric. São Paulo 19: 214–220. *3 fig.* 1918.—Anthracnose caused by *Gloesporium ampelophagum,* occurs destructively on *Vitis rupestris du Lot, V. rupestris paulista* and on the varieties Seibel and Niagara.—Another kind of anthracnose appeared on Niagara in 1918, caused by *Gl. physalosporae.* Sulfate of iron treatment is recommended.—*D. Reddick.*

1021. Averna Saccá, R. **Molestias encontradas sobre as folhas de fumo e de gergelim provenientes de Soccorro (Pernambuco) remettidas pela directoria de agricultura. [Foliage diseases of tobacco and gergelim.]** Bol. Agric. São Paulo 18: 984–986. 1917. [Reprinted Bol. Agric. São Paulo 19: 70–71 1918.]—Tobacco leaves from Pernambuco were found affected with *Cercospora solanicolum.* The numerous spots on the leaves rendered them nearly worthless. The disease appears in damp, shady places. Various species and varieties differ in their susceptibility. Since fungicides would injure the quality of the tobacco it is recommended that resistant varieties be used and that the plantation be arranged with reference to suitable air drainage.—A leafspot of *Sesamum indicum* (*Gergelim*) was found in which a species of *Cercospora* occurred. [From abst. in: Internat. Rev. Sci. Pract. Agric. 9, Entry 1058. 1918.]—*D. Reddick.*

1022. Belgrave, W. N. C. **Experiments on the prevention of brown bast.** Agric. Bull. Fed. Malay States 6: 187. 1918.—Experimental soil treatments for the control of "brown bast" [of rubber (?)] are suggested.—*J. Rosenbaum.*

1023. Belgrave, W. N. C., and F. W. South. **Field notes and observations on brown bast.** Agric. Bull. Fed. Malay States 6: 181–186. 1918.—An unknown disease of rubber trees found in the Malay States and Sumatra is described. Partial remedies are suggested.—*J. Rosenbaum.*

/ 1024. Bois, D. **Sur deux maladies des pommes: Water-core (Pommes vitreuses), Bitter Pit (Taches amères). [Two diseases of apples, water-core and bitter pit.]** Bull. Soc. Path. Veg. France 5: 34–41. 1918.—The author mentions the occurrence of these two diseases in France and gives a brief summary of the results of the principal investigations which have been made by previous writers, with citations of the most important papers published.—*C. L. Shear.*

1025. Brooks, Charles, J. C. Cooley, and D. F. Fisher. **Apple scald.** Jour. Agric. Res. 16: 195–217. *11 fig.* 1919.—See Bot. Absts. 2, Entry 1143.

1026. Burnham, Stewart H. **Charles Horton Peck.** Mycologia 11: 33–39. *Fig. 1.* 1919.

1027. Butler, E. J. **Immunity and disease in plants.** Agric. Jour. India (Special Indian Science Congress Number) *p. 10–28.* 1918.—It is necessary to distinguish between the avoidance of disease, the endurance of disease, and true immunity or resistance to disease. Several instances are given of the ways in which plants may avoid a disease to which they are not in any way truly resistant. They may be grown in areas with conditions of climate which the parasite cannot stand, it being shown that many of our most important cultivated plants have a wider range than their parasites. Or the date of sowing may be altered to a period when the temperature or humidity is unsuitable for the germination of the spores of the parasite. Or varieties may be grown which mature quickly, before the parasite can do them much damage. Cases are given of successful endurance of the attacks of a plant parasite. These are mostly connected with the vigour of the plant, and can be modified by different methods of cultivation and manuring.—True resistance to disease differs from the above in depending on some structural or physiological characters of the plant which prevent successful invasion by the parasite. The structural characters of importance in specific cases are detailed and examples given. The physiological characters which influence immunity are more difficult to define, but are undoubtedly the most important class of factors in the majority of cases. They are connected with the nature of the cell contents, not with the characters of the walls or other structural peculiarities. Sometimes the living part of the contents—the protoplasm—is chiefly involved; sometimes the non-living part—usually substances dissolved in the cell sap—is more important. Amongst these substances, tannin and organic acids are shown to occupy a prominent place.—The relative resistance to specific diseases of different varieties of plants is discussed, and indications given of the physiological characters most probably concerned.—The external conditions which modify physiological resistance are chiefly climatic and nutritional. Resistance in one locality does not necessarily imply resistance to the same disease in another locality. Soil is often important, the influence of calcareous soils being particularly evident in several diseases. Nutrition often has a strong influence on disease and there is a very wide field for further research in this direction. It is shown that all three of the more important plant foods obtained through the roots—nitrogen, phosphorus, and potassium—may, according as they are present in excess or are deficient, have a marked influence on susceptibility to disease. How they act is not known and attention is drawn to this problem as one on which Agricultural Chemists might throw much light if they could show how specific fertilizers influence the chemical composition of the plant cell.—*Wm. McRae.*

1028. Capus, J., and J. Feytoud. **Note sur une maladie du noyer. [Note on a disease of the walnut.]** Bull. Soc. Path. Veg. France 5: 61–63. 1918.—The disease occurs on the cultivated walnut about Terrasson, France. Affected plants show yellowing of the leaves, the tips of the branches die, and in a few years the trees are dead. A fungus, believed to be *Armillaria mellea,* is found on the roots. This has been considered the cause of the disease.—*C. L. Shear.*

1029. Carsner, Eubanks. **Angular leafspot of cucumber: dissemination, overwintering and control.** Jour. Agric. Res. 15: 201–220. *Pl. 13–16.* 1918.—*Bacterium lacrymans* on *Cucumis sativus* causes angular spots on leaves and circular, water-soaked spots on fruits. The disease is widely distributed and the losses from it places it among the diseases of major importance for cucumbers.—Infection on leaf and fruit is by way of stomates. Inoculations made at different hours show that infection occurs chiefly during the day rather than at night, and this is probably correlated with stomatal movement.—The organism is disseminated chiefly by rain, but pickers and probably insects play a part in the process. It is readily killed in artificial media by freezing, and by heat at 50° for 10 minutes. It is readily killed by the common germicides. The bacteria are sensitive to desiccation but have been found to persist for 7 months on seed and it is thought that this is the common method of over-wintering.—No resistant varieties have been found. Sanitary measures with reference to picking may prove helpful in control but seed treatment offers the greatest hope of economical control of the disease.—*D. Reddick.*

1030. Colley, Reginald H. **Parasitism, morphology and cytology of Cronartium ribicola.** Jour. Agric. Res. 15: 619–659. *Pl. 48–59.* 1918. See Bot. Abst. 2, Entry 992.

1031. Davis, W. H. **Chlorotic corn (A progress report).** Proc. Iowa Acad. Sci. 24 (1917): 359–460. 1918.—Chlorotic corn plantlets have been noticed for a number of years. Numerous infection experiments with sap from sick plants of the supposed organism were made, but the results were negative. The roots appeared normal while the chlorotic leaves die. One case was noted where new leaves seemed to contract the disease. Seemingly warranted conclusions are that the embryos of corn may be chlorotic. Chlorosis may not be transferred by contact or sap. When plantlets are entirely chlorotic they will not mature.—*I. E. Melhus.*

1032. Denis, Marcel. **Sur quelques thalles d'Aneura dépourvus de chlorophylle.** [**Concerning certain thalli of Aneura devoid of chlorophyll.**] Compt. Rend. Acad. Sci. Paris 168: 64–66. *Fig. 1–2.* 1919.—See Bot. Absts. 2, Entry 982.

1033. Dufrénoy, J. **Les réactifs biologiques de l'espèce et la spécificité parasitaire.** [**Biological tests of species and parasitic specificity.**] Rev. Gén. Sci. 30: 44–47. 1919.—Review of recent literature on biological species, especially that of Stakman and co-workers. [See Bot Absts. 3, Entry 822.]—*D. Reddick.*

1034. Dufrénoy, Jean. **The biological significance of false witches'-brooms in Ericaceous plants.** Jour. Washington Acad. Sci. 8: 527–532. 1918.—Witches'-brooms showing infection with *Exobasidium unedonis* Maire, *Gloeosporium conviva* Maire and *G. myrtillus* n. sp. occur on *Arbutus unedo.*—Regarding the assumption that mycelia growing in the vascular tissue hinder the ascent of water and result in partial starvation of the leaves, the author states that the vessels are never obstructed by the fungi mentioned. Infected leaves are rolled up and present less surface to transpiration. They also contain red coloring matter which might cause modification of transpiration. Experiments indicated that the leaves of the diseased shoots show greater transpiration than normal leaves. This is regarded as due to the diseased leaves remaining juvenile while the sound leaves become thickly cutinized. Insoluble carbohydrates were scarce in the diseased tissues.—Glucocides were found in the sound tissues but were lacking in those infected with *Gloeosporium.* As the false witches'-brooms possess very low if not fully inhibited power of assimilation and are shorter lived than healthy shoots, they cannot be interpreted as symbiotic organisms as suggested by Vuillemin.—*C. L. Shear.*

1035. Fromme, F. D., and T. J. Murray. **Angular leaf spot of tobacco, an undescribed bacterial disease.** Jour. Agric. Res. 16: 219–228. *Pl. 25–27.* 1919.—An epiphytotic occurred in the tobacco (*Nicotiana tabacum*) fields of Virginia in 1917. This was a season of heavy rainfall and subnormal temperature. In many fields every plant was affected and fully half the crop rendered unfit for harvest. Vigorous plants invariably were more affected than weak ones.—Lesions occur only on the leaves and are most abundant on the top and middle leaves. The spots are angular and may reach 8 mm. in diameter. As many as 500 spots may be found on a heavily infected plant.—Bacteria were isolated readily and inoculations made on plants in the greenhouse, with the atomizer, by smears, or by needle pricks, were successful. Vigorous plants showed the most lesions and the incubation period was shortest (4 days) in them. Average incubation period 7 days.—The organism does not seem to have been previously described and the name *Bacterium angulatum* is proposed for it. Cultural characters are stated briefly. Group number 211.2322033.—*D. Reddick.*

1036. Gabotto, L. **La peronospora del mais.** [**Mildew of maize.**] Il Coltivatore 64: 331–333. *3 fig.* 1918.—Plants attacked by *Sclerospora macrospora* presented not only a weakly appearance but had virescent male flowers and no ears. [From abst. in: Internat. Rev. Sci. and Pract. Agric. 9, Entry 1053. 1918.]—*D. Reddick.*

1037. Gardner, M. W. **Anthracnose of cucurbits.** U. S. Dept. Agric. Bull. 727. *68 p., 15 fig.* 1918.—A monographic treatment of the disease in all phases. The work of others to date is brought together and from observation and experiment numerous contributions are

made.—The life history of the fungus, *Colletotrichum lagenarium*, has been studied minutely and important stages are illustrated. The nutrition of the fungus is reported in some detail.—The fungus has been found in soil under diseased plants and in surface drainage after rains. Evidence is presented that the fungus overwinters in the field and that it may be carried on the seed. Spraying does not afford an effective control. [See Bot. Absts. 1, Entry 1666.]—*H. W. Dye.*

1038. GIDDINGS, N. J. **Infection and immunity in apple rust.** West Virginia Agric. Exp. Sta. Tech. Bull. **170:** *71 p., 11 pl.* 1918.—A brief summary of previous work on *Gymnosporangium juniperi-virginianae* and the disease it produces, is given. The exact dates on which apple leaves became infected were determined. A number of leaves were exposed to and the same number protected from infection each day. A careful record of the development of the rust galls on the cedar, of meteorological conditions and of the development of apple foliage was kept. It was found that an abundant discharge of sporidia was not necessarily followed by a serious rust outbreak, since there might be a lack of sufficient air movement for their wide dispersal or unfavorable temperature or humidity conditions might prevent infection. The optimum temperature for infection is thought to be about 65° F. Few sporidia were discharged at 50° F.—A study of leaf growth as related to susceptibility showed that those apple leaves which grew after being inoculated usually became infected while leaves which made no further growth were for the most part immune. A list of the varieties of apples susceptible to rust, is given. There seems to be considerable individual variation in the resistance of apple trees of the same variety. This difference is also shown by cedar trees as indicated by the fact that one tree may bear a large number of galls, while another tree of the same kind standing close beside it may have few or no galls. Data presented show that the greatest injury to apples is due to the loss of foliage with consequent loss of vitality. A distinct correlation was found between the number of rust spots on the leaves and the rate of leaf fall.—It was found that apple rust could be controlled by the common spray mixtures, if applied within a day or two before the infection period. The removal of the red cedar trees, however, seems to be the only practical method of controlling this disease in commercial apple orchards.—*J. L. Weimer.*

1039. GUILLOCHON, L. **Une maladie cryptogamique du fruit de la tomate. [A fungous disease of tomato fruit.]** Bull. Soc. Hortic. Tunis **16:** 131–133. 1918.—A fungous disease of tomatoes has been noted in different gardens which is attributed to *Phoma destructiva*. Various insects were found to be responsible for the spread of the disease.—*J. Rosenbaum.*

1040. HEMMI, TAKEWO. **Vorläufige mitteilung über eine neue anthraknose von Evonymus japonica. [A new anthracnose of E. japonica.]** Ann. Phytopath. Soc. Japan **1:** 9–15. 1918.—A fungus described as *Gloeosporium evonymicolum* Hemmi, n. sp. causes spots on the leaves of the host, which gradually die and fall. Inoculation experiments show that the fungus is able to penetrate the uninjured epidermis of leaves of *Evonymus japonica* and of *E. radicans.* —*H. A. Edson.*

1041. HENNING, ERNST. **Anteckningar om s. k. Slidsjukan med anledning av dess uppträdande a vete 1915 och 1918. [Notes on the socalled sheath disease with reference to its occurrence on wheat in 1915 and 1918.]** K. Landtbr. Akad. Handl. och Tidschr. **57:** 418–426. *Fig. 1–3.* 1918.—The sheath disease of wheat is a physiological disease and may be caused by climatic conditions, soil conditions, and insects. The dry weather, strong winds, and heavy frosts in Sweden during the summer of 1915 and 1918 were responsible for heavy losses, especially in northern, eastern, and southern sections. Unfavorable soil conditions, such as poor fertilizing, light sandy soils, badly washed soils, soils that favor drouth, etc., favor the development of the disease.—The plants may become diseased at different stages of its growth. Usually, however, the disease begins the latter part of May and reaches its highest development by midsummer (June 24), the plants becoming stunted and finally ceasing growth. The upper leaves, sheaths, and parts of the culms become yellow or gray-violet, and the upper leaves are often spiral. The culms are normal below, shrunken above, the heads poorly filled, and the kernel shrunken and dried up, and finally the leaves, sheaths, and

heads are covered with saprophytic mold. New shoots often grow from the base of stunted plants.—Recommendations for control: Good soil conditions, early varieties of wheat, not too early planting, and rotation with rye.—*J. I. Lauritzen.*

1042. Hori, S., and U. Bokura. **Soy bean cake as a substitute for peptone in the preparation of the nutrient media.** Ann. Phytopath. Soc. Japan 1: 27–30. 1918.—Soy bean cake, largely imported from China as a nitrogenous fertilizer, has been found a satisfactory substitute for peptone in media for general use as well as for the cultivation of such animal pathogens as the mouse typhus bacteria. Extract from 30 grams replace 20 grams of peptone. From the analysis it appears that the chief nourishing component is crude protein (caseine). This is precipitated by acid, and soy bean cake is not suited for the preparation of acid media. Sodium carbonate is used to give an alkaline reaction in preparing bouillon. [See Bot. Absts. 2, Entry 316.]—*H. A. Edson.*

1043. Hubert, Ernest E. **Fungi as contributory causes of windfall in the Northwest.** Jour. Forestry 16: 696–714. 1918.—The force of the wind is classified as the primary cause of windfalls, and all other causes, such as cutting operations, fungi, soil, fire, snow, height of trees, size of crowns, exposure, etc., are classed as secondary causes. Cutting operations and soil conditions take first place in importance as causing windfall damage, fungi second, exposure third.—Fungi as secondary causes play an important part in causing windfall. A large amount of damage to National Forests and the remaining forest region as well, reckoned upon a financial basis, is annually sustained through windfall; a considerable portion of this loss can be traced to fungous action alone.—Fungous attack is largely responsible for windthrow in western white pine, one of the most important timber trees. It is also a menace through windthrow to all stands of infected timber left as thinned stands or as seed trees after cutting operations.—The principal fungi concerned in causing windfall are *Polyporus schweinitzii, Trametes pini, Echinodontium tinctorium, Fomes annosus, Armillaria mellea,* and *Sparassis radicata.*—Recommendations are made that all trees marked to be reserved in selection cuttings or as seed trees upon a cutover area are to be free from root, butt and trunk rots. A bibliography of 26 titles is appended.—*Ernest E. Hubert.*

1044. Johnston, John R., and Stephen C. Bruner. **Enfermedades del naranjo y otras plantes citricas. [Diseases of the orange and other citrus plants.]** Bol. Estac. Exp. Agron. Cuba 38: 1–54. *15 pl.* 1918.—All of the diseases affecting citrus plants known to occur in Cuba are considered, together with the injuries due to the rust mite and to red spiders but, as the authors point out, considerable data are still lacking and several years of uninterrupted investigation will be necessary before the cause and means of controlling several of the more important diseases can be determined. The following troubles are treated in this report: fruit-rot, dieback, and gummosis due to *Diplodia natalensis;* anthracnose and withertip (*Colletotrichum gloeosporioides*); withertip of limes due to *Gloeosporium limetticolum;* scab (*Cladosporium citri*); fruit rots due to *Penicillium italicum* and *P. digitatum;* blossom end rots attributed to *Alternaria* (*citri*) and *Colleotrichum gloeosporioides;* end rot of Persian limes (cause not determined); citrus knot (*Sphaeropsis tumefaciens*); rust mite (*Eriophyes oleivorus*); red spiders (*Tetranychus sexmaculatus, T. mytilaspidis, Tenuipalpus californicus,* and *Tarsonemus latus*); foot-rot, evidently due in part to *Phytophthora* (*terrestria?*); gummosis; psorosis; Ceballos "scab" disease (cause unknown); black melanose or greasy spot; melanose (*Phomopsis citri*)—not known to occur in Cuba; chlorosis and mottled leaf: spots on leaves, fruit and twigs due to the alga *Cephaleuros;* damping-off (*Rhizoctonia* and *Sclerotium*); sooty mold (*Capnodium citri*); citrus canker (*Pseudomonas citri*)—not known to occur in Cuba; and various troubles of minor importance in Cuba including "buckskin," "blight," round spots on fruit, fruit gummosis, and lichens.—*S. C. Bruner.*

1045. Krout, W. S. **Report on diseases of celery.** New Jersey Agric. Exp. Sta. Rept. 1916: 584–603. 1918.—Experiments in treatment of seed beds and in the control of rots and also field spraying experiments for the control of *Cercospora apii* and *Septoria petroselini* var. *apii.* The soil organisms were controlled in the seed beds by the use of formaldehyde.

Soil sterilization in the field by the use of steam was successful and some chemicals proved to be slightly germicidal in the treatment of soil. Bordeaux mixture was the most satisfactory treatment for the control of the early and late blight.—*M. T. Cook.*

1046. Kunkel, L. O. **A method of obtaining abundant sporulation in cultures of Macrosporium solani E. & M.** Mem. Brooklyn Bot. Gard. 1: 306–312. *4 fig.* 1918.—Undisturbed cultures rarely produce spores but if the mycelium is wounded, when the culture is 2 or 3 days old, abundant sporulation is induced. The wounding may be accomplished by scraping the surface of a culture with a scalpel or even with a strong platinum needle. The more thoroughly the scraping is done the greater will be the quantity of spores produced.—Spores in chains of two are rarely observed in cultures which are fruiting vigorously.—Study of *M. solani*, *M. tomato* and *M. daturae* in pure culture shows many differences especially in the morphology of spores and they are believed to be distinct species.—*D. Reddick.*

1047. Lees, A. H. **"Reversion" and resistance to "big bud" in black currants.** Ann. Appl. Biol. 5: 11–27. *Pl. 3–6.* 1918.—"Reversion" is characterized by one or more of the following characters: the fruit "runs off," i.e., at picking time either there are no berries left or only a few undersized fruits remain; there is an extensive growth of laterals resulting in a crowded, instead of an open form of bush (one of the most characteristic signs of a reverted bush); the internodes are long and thin; the leaf is sharp pointed and abnormally narrow.—Author observes that "reversion" occurs most frequently amongst mite attacked bushes. In cases where numerous mites make an attack, the result is a condition known to growers as "oak leaf," and is a certain sign of a mite infested terminal. This condition is followed by a forcing of some of the lower lateral buds. Mite resistance was observed in Seabrook's Black, and its resistance is accounted for through its high susceptibility; the mite kills the growing point in an attacked bud and as a result cuts off the food supply and thus starves itself. [See Bot. Absts. 2, Entry 322.]—*L. R. Hesler.*

1048. Lemee, E. **Balai de sorcière sur Pirus communis. [Witches'-broom on Pyrus communis.]** Bull. Soc. Path. Veg. France 5: 32–33. 1918.—Witches'-brooms found on pear trees in France are described. They are supposed to be caused by an undetermined fungus, the mycelium of which was found in the diseased parts.—*C. L. Shear.*

1049. Lind, J., and F. K. Ravn. **Forsøg med midler mod byggets stribesyge. [Disinfection of seed against Pleospora graminea, injurious to barley.]** Tids. Planteveal 25: 56–116. 1918.—Extensive investigations have been made to determine the best method of disinfecting seed barley against *Pleospora graminea.*—If proper precautions are observed good results are secured by treating the seed in one of the following solutions: (1) Soak 6 hours in 0.2 per cent formaldehyde solution; (2) or 4 hours in 0.5 per cent copper sulfate solution; (3) or 2 hours in 0.1 per cent mercuric chlorid solution. If seed is not badly affected the time of soaking may be reduced one half.—Various hot water treatments were tried and while fairly effective none was so good as any of the 3 above-named solutions.—Early sowing in cold soil favors the development of the disease.—[From abst. in: Internat. Rev. Sci. Pract. Agric. 9, Entry 1302. 1918.]—*D. Reddick.*

1050. Mackie, D. B. **Some observations on citrus canker.** California Citrograph 3: 231, 244–245. 1918.

1051. Martin, W. H. **Tomato spraying experiments at Riverton, N. J.** New Jersey Agric. Exp. Sta. Rept. 1917: 540–561. *2 pl.* 1918.—Cöoperative experiments for the control of tomato leaf spot (*Septoria lycopersici*) begun in 1916 were continued. The scope of the work was broadened to include tests of several modifications of Bordeaux mixture as well as to determine the relative merits of traction and power sprayers.—The sprays tested controlled the leaf spot in the following order: (1) 4: 2: 3: 50, (2) 4: 4: 3: 50, (3) 0.5: 0: 3: 50, (4) 4: 4: 50, (5) 2: 0: 4: 3: 50 (the third digit referring to pounds of resin fish oil soap). While the Bordeaux soap mixtures gave best control the standard Bordeaux mixture gave

greatest returns. The copper-resin fish oil soap proved very efficient. Pickering's Bordeaux mixture proved to be of little value.—Little difference resulted from the use of the power and traction sprayers; the latter, due to its lower cost of up-keep would appear the better.—Early spray applications for the control of leaf spot do not appear to be essential under New Jersey conditions. The results indicate that if a majority of the leaves are held until frost a large part of the fruit formed will not ripen. The advisability of spraying late varieties of tomatoes under certain conditions is questioned. The results emphasize the importance of spraying at the proper time.—*W. H. Martin.*

1052. Martin, W. H. **Tomato spraying experiments at Salem, N. J.** New Jersey Agric. Exp. Sta. Rept. 1916: 575–583. *1 fig.* 1918.—A report of spraying experiments for the control of leaf spot of tomatoes, caused by *Septoria lycopersici*. The work was designed to determine (1) the best strength of Bordeaux mixture to be used; (2) the proper time to make the applications.—The 4: 4: 50 mixture gave best results. All the sprays tested gave increased returns over the unsprayed plots. While the results obtained tend to favor early applications this is due, in large part, to the protection afforded the young plants from insect injury. Fruits from sprayed plants had a better color and firmer texture than fruit from similar, unsprayed plants. The results indicate that spraying has little, if any, influence on tomatoes grown for the cannery or late market.—*W. H. Martin.*

1053. McMurran, S. M. **Preventing wood rot in pecan trees.** U. S. Dept. Agric. Farmers' Bull. 995. *8 p.* 1918.

1054. McRae, W. **Phytophthora Meadii n. sp. on Hevea brasiliensis.** Mem. Dept. Agric. India, Bot. Ser. 9: 219–273. *Pl. 1–3, 3 fig.* 1918.—A disease of *Hevea brasiliensis* in India, caused by an apparently new species of *Phytophthora*, is described. Detailed symptoms of the disease as it occurs in the field as well as microscopic characters of affected tissues are given. The fungus was obtained and grown in pure culture. Inoculation experiments were performed on the various parts of the host and the fungus reisolated from the artificially infected parts. While in nature the fungus has been found only on *Hevea brasiliensis*, artificial infections have been induced on *Manihot glaziovii* and *Ricinus communis*. Morphological comparisons with other described species of *Phytophthora* convince the writer that it is a new species and it is designated as *Phytophthora Meadii* n. sp. The fungus during the dry season is found as mycelium in the dead branches and as oospores in the dried-up fruits. Removal of diseased branches and fruit, and the destruction of the flowers in order to prevent the formation of fruit, are suggested as possible remedies.—*J. Rosenbaum.*

1055. McRae, William. **A new species of Phytophthora parasitic on the Para rubber tree.** Jour. Bombay Nat. Hist. Soc. 25: 760. 1918.

1056. Meier, F. C. **Relationship of fungous diseases to the watermelon industry.** Off. Minutes Melon Distributors' Assoc. 4: 19–28. 1918.

1057. Melhus, I. E., and J. C. Gilman. **An improved method of potato seed treatment.** Iowa Agric. Exp. Sta. Circ. 57. *8 p., 9 fig.* 1919.—A brief discussion is given of the occurrence of black leg, black scurf, common scab, and dry rots of the potato. The hot formaldehyde method for potato seed treatment is described and recommended as a control measure. This consists of dipping the seed in a hot formaldehyde solution for 2 minutes at 48° to 50°C., piling the potatoes 6 to 8 inches deep and covering for one hour.—*I. E. Melhus.*

1058. Metcalf, Haven. **The problem of the imported plant disease as illustrated by the white pine blister rust.** Mem. Brooklyn Bot. Gard. 1: 327–333. *Pl. 6–7.* 1918.—A brief history of white pine blister rust, caused by *Cronartium ribicola*, particularly its introduction and spread in U. S. A.—"The entire blister rust problem is, however, but one phase of a larger problem, which may be stated as follows: does free trade in plant diseases and insect pests pay? Is it an economically sound national policy? Is the entire importing nursery

business worth as much to the country as the damage which it has already caused? Not a single plant disease or insect pest that has once become established in this country has been eradicated or, in the present state of knowledge, is ever likely to be. No matter how well controlled, it remains in every case a permanent tax against our economic resources. Even if we succeed in controlling the white pine blister rust we may be absolutely certain that other diseases and pests are being introduced which will be just as serious, for we know definitely that the undesirable plant immigrants are not yet all here. It is much more important to safeguard the country against further invasions of this kind than to control this or any other disease or pest that has already been carelessly permitted to establish itself."—*D. Reddick.*

1059. Metcalf, Haven. **Summary of the white-pine blister rust situation.** Jour. Forestry 16: 85–89. 1918.—Remarks at the close of the conference of the Committee on the suppression of Pine Blister Disease in North America, held at Pittsburgh, Pennsylvania, Nov. 12, 13, 1917. [See Bot. Absts. 1, Entry 137.]

1060. Mottet, S. **La dégénérescence des pommes de terre. [Degeneration of potatoes.]** Jour. Agric. Prat. 31: 327–329. 1918.—Degeneration is considered a grave malady of the potato, threatening to exterminate many varieties. No definite causes of this trouble have been established, but they are supposed to be complex and diverse. An important rôle is attributed to the continuous planting of the same stock on the same soil. *Filosité* (spindly sprout) and *boulent* (failure to germinate) are said to be the two general and characteristic manifestations of the disease. The writer reviews certain previous literature on this subject, appearing in England, Germany, and France. He names a number of varieties for the support of the theory that the smooth-eyed varieties are less resistant than the deep-eyed varieties, although exceptions are given. The effect of continued asexual propagation is admitted, but attention is called to the fact that there, too, is a marked difference in resistance. Much importance in combating degeneration is attached to the frequent renewal of seed potatoes, which should be introduced preferably from cool regions every three or four years at least. As additional measures the author suggests sunning of the seed tubers for germination, rejection of all the spindly sprout specimens, selection of more vigorous and healthy hills, and repeated spraying to prevent other contributing diseases. If in spite of all this care varieties run out, it is best to discard them altogether.—*H. A. Edson.*

1061. Nowell, William. **Infection of orange fruit through bug punctures.** Agric. News, Barbados 17: 142. 1918.—The sweet orange has been added to the list of fruits serving as hosts for the fungi associated with the internal boll disease of cotton. *Nematospora* sp., the species *D* of Nowell, was found in the pulp near the surface of an orange purchased in Barbados and said to have come from Grenada.—*D. Reddick.*

1062. Nowell, William. **Fomes lucidus as a parasite of trees.** Agric. News, Barbados 17: 46. 1918.—Brief note on the occurrence of *F. lucidus* on *Pithecolobium saman* and *P. unguis-cati* with a review of recent literature on the subject.—*D. Reddick.*

1063. Paine, Sydney G. **Internal rust spot of the potato tuber (Preliminary communication).** Ann. Appl. Biol. 5: 77–79. 1918.—Brownish red spots which characterize the disease are distributed throughout the flesh of the tuber. They consist of cells with thickened and strongly liquified walls containing brown protoplasm in which starch grains may be embedded or the starch may be replaced by globules of oil or tannin. The symptoms of the disease correspond exactly with those described by Horne (Jour. Agric. Sci. 3: 323) as internal disease, and by Mayer (Journ. für Landwirtschaft 55: 301), A. B. Frank (Kampfbuch g. d. Schädlinge unserer Feldfruchte, Berlin, 1897, p. 211), Sorauer and Rorig (Pflanzenschutz. Berlin, 1910, p. 154), B. Frank (Ber. Deut. Bot. Ges. 16: 287), as "Buntwerden," "Eisenfleckigkeit," "Buntheit," and "Stockfleckigkeit." An organism has with difficulty been isolated and shown to be the cause of the disease which has hitherto been regarded as physiological.—*H. A. Edson.*

1064. PAINE, SYDNEY G. **An epitome of bacterial diseases of plants in Great Britain and Ireland.** Ann. Appl. Biol. 5: 62–67. 1918.—Bibliography of 50 citations.—Bacterial diseases which have been studied are white rot of turnips and other vegetables, *B. carotovorus;* heart rot of celery, *B. carotovorus;* black leg of potato, *B. atrosepticus;* hyacinth yellows, *P. hyacinthia;* black rot of crucifers, *P. campestris;* a disease of *Pisum sativum* caused by *P. seminum* Cayle, which is present in the cotyledons, germinates with the seed, passes up the stem in the mobile stage, and is found in the seed pod; and a bacterial blight of peach blossoms which was discovered to be of bacterial origin by BARKER AND GROVE in 1913. The disease and causal organism are described briefly and the opinion is expressed that the organism, which is not mentioned by name, is identical with one obtained by Doidge in South Africa from a similar disease. Potato scab, crown gall, brown rot of potato, and Iris rot, all probably identical with the American diseases of the same names, are present but uninvestigated. Bacterial blight (blossom end rot) of tomatoes, orchid leaf spot, leaf roll of potato, mosaic of tomato, sprain of potatoes, and silver leaf disease are also included as of probable or possible bacterial origin.—*H. A. Edson.*

1065. PAMMEL, L. H. **The extermination of the common barberry to prevent crop leakage due to stem rust.** Iowa Conservation 2^1: 4–8. 1918.—A review of the literature is given on stem rust (*Puccinia graminis*) and the object of the barberry eradication campaign as carried on in Iowa and the spring wheat district of the Middle West.—*I. E. Melhus.*

1066 PANTANELLI, E., **Sul la resistenza delle piante al freddo. [On the resistance of plants to cold.]** Atti R. Accad. Lincei, Cl. Sci. Fis., Mat. e Nat., Rend. V, 27^1: 126–130, 148–153. 1918.—See Bot. Abst. 2, Entry 1135.

1067. PETCH, T. **The application of preservatives to renewing bark of rubber.** Trop. Agric. 51: 40–45. 1918.—Experiments were performed to determine what amount of injury is caused to renewing bark by various preservatives.—The extent of penetration was determined microscopically. It varies from no penetration to 0.8 mm., according to the material used. Maximum penetration has occurred within 10 days after the date of treatment. The following substances were used, usually full strength and in several dilutions or in mixtures: coal tar, liquid fuel, "Brunolium," "Brunolium plantarium," "Carbolineum plantarium," "Jodelite," "Izal," coke-still residue, "Cargill's" mixtures "A" and "B." None produced injury and there was no spontaneous exudation of latex following treatment. The liquids are easiest to use. "Brunolium," "B. plantarium," "Carbolineum plantarium" and "Jodelite" in 20 per cent strength are used to cure bark rot. They are to be applied as soon as the disease appears and 6 applications are made at intervals of 3 days. These materials in 5 per cent solution are used to prevent bark rot (black stripe). They are applied after every tapping.—*D. Reddick.*

1068. PETHYBRIDGE, GEORGE H. **Investigations on potato diseases. Ninth report.** Dept. Agric. and Tech. Instr. Ireland 18: ——. 1918.—Report of experiments carried on during summer of 1917. Burgundy mixture proved quite as efficacious as Bordeaux mixture in preventing late blight (*Phytophthora*). Spraying programs of two, three and four applications each, applied at suitable intervals, gave consecutively better results than that of a single application applied early in the season. One per cent bordeaux mixture cannot be recommended unreservedly even though, in many cases, it gives as good results as the two per cent.—The varieties tested for resistance to late blight were found to vary from highly resistant to susceptible. Clifton Seedling and Champion II proved strongly resistant; "*K*" Seedling, Shamrock and Northern Invincible are recorded as resistant. Great Scot, Dominion, Burnhouse Beauty, Provost and Kerr's Pink which are immune to black scab (*Chrysophlyctis*) were found by no means to be immune to late blight, pink rot (*P. erythroseptica*) or corky scab (*Spongospora*).—*Charles R. Stevenson.*

1069. RAMIREZ, ROMÁN. **Enfermedades del camote. [Diseases of the sweet potato.]** Rev. Agric. [Mexico] 2: 344. 1918.—In March of 1918 there appeared in Lower California

for the first time a serious disease of the sweet potato which caused the loss of the crop. There was a whitish streaking in the tender potato and an ooze to which the dirt adhered. Fungous hyphae were found but no fruiting bodies. The disease is attributed to *Oozonium omnivorum*.—*F. M. Blodgett.*

1070. Ramirez, Román. **Manifestation rara en una cebolla.** [**A rare affection of an onion.**] Rev. Agric. [Mexico] **2**: 34. *1 fig.* 1918.—An onion was found with the base of the leaves decayed and partially covered with a stiff whitish foam. A bacterium was found and partly described but inoculations resulted negatively.—*F. M. Blodgett.*

1071. Reddick, Donald. **Protecting the orchard by dusting.** Trans. Indiana Hortic. Soc. **1917**: 126–139. 1918.

1072. Reddick, Donald. **Some essential facts about apple scab.** Trans. Indiana Hortic. Soc. **1917**: 84–92. 1918.

1073. Ritzema Bos, J. **Ziekten bij kool.** [**Diseases of cabbage.**] Tijdschr. Plantenz. **24** (*Bijblad*): 26–35. *Fig. 1–3.* 1918.—Further information for growers in Holland, concerning the club root of cabbage, caused by *Plasmodiophora brassicae*.—*G. F. Puttick.*

1074. Sanders, G. E., and A. Kelsall. **Some miscellaneous observations on the origin and present use of some insecticides and fungicides.** Proc. Ent. Soc. Nova Scotia **1918**: 69–75. 1919.

1075. Sanders, G. E., and A. Kelsall. **A copper dust.** Proc. Ent. Soc. Nova Scotia **1918**: 32–37. 1919.—12.5 pounds of powdered, dehydrated copper sulfate ($CuSO_4$) was mixed with 80 pounds of dry, hydrated lime ($Ca(OH)_2$) and to this was added 7.5 pounds of dry arsenate of lime (40 per cent. As_2O_5). This provides for 5 per cent metallic copper and 2 per cent metallic arsenic and is referred to as 5: 2 copper arsenic dust.—Tests were made on potatoes using about 50 pounds of 5 : 2 dust per acre. The dust mixture gave as good or better results than liquid Bordeaux with an arsenical both in the control of late blight [*Phytophthora*] and of the potato beetle [*Phoradora*].—Tests on apples are inconclusive as to the fungicidal and insecticidal value of the mixture but no injury followed the use of a 5:2 dust mixture. —Data on the relative cost of material for dusting and for spraying as well as the relative cost of making the applications are included.—"The dust here described has proved promising in experiments and is worth further trial."—*D. Reddick.*

1076. Sanders, G. E., and W. H. Brittain. **A modified Bordeaux mixture for use in apple spraying.** Proc. Ent. Soc. Nova Scotia **1918**: 51–61. 1919.—A short review of the chemistry of Bordeaux mixture and of injury to foliage from its use. Lime-sulfur solution applied with high pressure and greater capacity nozzles was found to cause such injury that it became necessary to find a harmless and efficient substitute. The authors give a preliminary report of their experiments with a Bordeaux containing a large excess of lime. Bordeaux of the standard formula was compared with 2 : 10 : 40 and 3 : 10 : 40 formulae. Where three parts of lime to one of copper sulfate was used the injury (yellowing of foliage and dropping of fruit) was reduced to a minimum. They conclude that it is unsafe to use less than three parts of lime to one of copper sulfate in making Bordeaux for repeated applications to the apple. There is indication that substituting "soluble sulfur" (1 pound to 40 gallons water) in the third spray will greatly reduce or entirely eliminate russeting of fruit. To this spray material should be added ¾ pound calcium arsenate (40 per cent. AS_2O_5) for biting insects and 5 pounds of hydrated lime to prevent injury from this arsenical. This excess-lime Bordeaux compares favorably with sulfid sprays in the control of apple scab even on the susceptible McIntosh variety. It is growing rapidly in favor in Nova Scotia and New Brunswick.—*L. R. Hesler.*

1077. Schoevers, T. A. C. **Iets over wortelknobbels en andere kankerachtige uitwassen bij planten.** [**Concerning root galls and other canker-like growths on plants.**] Tijdschr.

Plantenz. 24: 123–148. 1918.—The author discusses the symptoms, history and methods used in determining the cause of so-called crown-gall disease. Erwin F. Smith's researches on the disease are described in detail.—*G. F. Puttick.*

1078. SOUTH, F. W. **Buried coconut trunks and root diseases of rubber.** Agric. Bull. Fed. Malay States 6: 269–270. 1918.—Two root diseases of rubber trees caused by *Hymenochaete noxia* and *Poria hypolateritia* are attributed to the burying of coconut trunks in holes between the rows of rubber trees.—*J. Rosenbaum.*

1079. SOUTH, F. W. **Revised distribution of pink disease by mukims.** Agric. Bull. Fed. Malay States 6: 389–394. 1918.—It has been found that the river mukims are free from the pink disease.—*J. Rosenbaum.*

1080. SPRENGER, A. M. **Gloeosporium lindemuthianum in princess-eboonen. [G.l. on beans.]** Tijdschr. Plantenz. 24 (Bijblad): 20. 1918.—In controlling the disease, it is emphasized that elimination of diseased seed does not always produce the result desired, for practical reasons. Hence, the necessity of using formalin treatment also. It is suggested also that infection may take place through spores in the soil or from neighboring infested fields.—*G. F. Puttick.*

1081. STAKMAN, E. C., AND M. N. LEVINE. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–77. 1919.—A study of the effect of hosts and of such factors as light, heat and humidity on the morphology of urediniospores.—It was determined that the amount of inoculum used has no perceptible effect on the result of infection or on the size of spores; that the optimum period of exposure to conditions favorable for infection is 48 hours; that the superficial layer in each uredinium contains spores of larger dimension than those beneath it; that in determining the size of spores measurement of 100 individuals from several uredinia gives accurate results and that in stating the size of spores the use of biometrical mode offers a practical basis for comparison.—The following biological forms of *Puccinia graminis* were investigated: *tritici*, *tritici-compacti*, *secalis*, *avenae*, *phleipratensis*, and *agrostis*. When grown on congenial hosts and under identical conditions it is found that urediniospores of these forms have a definite size, shape and color and it may be that they "represent incipient morphological species." The form *avenae* is an exception in so far as shape and size are concerned, these being very plastic.—Biologic forms are not unified by continued growth on common and congenial hosts, but on uncongenial hosts the size of uredinia and of spores is reduced.—If the host is supplied plentifully with water and light, optimum temperature for the development of the rust ranges between 66.5° and 70°. Above 70° the incubation is retarded 1 day for every 10° rise of temperature and below 66° it is retarded 1 day for every 5° fall.—The fungus attacked more severely plants grown in wet soil than those grown with a moderate amount or with very little water and the urediniospores are larger on such plants.—The fungus developed better on plants grown under fairly high light intensity than under a low one and the size of urediniospores was correspondingly larger.—The virulence of the parasite. and size of spores is not affected by the age of the host plant providing the host is healthy. Similarly, the length of association of a rust with its host (after the uredinium has burst until the formation of teliospores) does not impair the vitality of the fungus nor is the size of urediniospores in the next generation affected.—*D. Reddick.*

1082. STAKMAN, E. C., M. N. LEVINE, AND J. G. LEACH. **New biologic forms of Puccinia graminis.** Jour. Agric. Res. 16: 103–105. 1919.—About a dozen distinct forms are now known. The new forms have been tested on 25 strains and varieties of *Triticum aestivum*, *T. durum*, *T. compactum*, *T. dicoccum* and *T. moncoccum* as differential hosts. Only one variety, Khalpi, an emmer originally imported from India, is not susceptible to some one or more of the known strains of the fungus.—The discovery of these new forms is an added reason for eradicating the rust-susceptible varieties of barberry (*Berberis*) as a means of rust control in northern U. S. A. It also explains why a variety of wheat may be immune in one

section and not in another and makes questionable the advisability of attempting to develop rust resistant wheats until more is known about the specialization of parasites.—*D. Reddick.*

1083. Stevenson, John A. **Cuarentena de plantas. [Quarantine of plants.]** Rev. Agric. Puerto Rico 1: 176–180. 1918.—Reasons why a plant quarantine is necessary are given with examples cited of diseases and insects that have caused serious losses when introduced into various countries and examples of diseases that have not yet reached Porto Rico.—*F. M. Blodgett.*

1084. Stevenson, John A. **La enfermedad de las raices de la caña. [The disease of sugar cane roots.]** Rev. Agric. Puerto Rico 1: 269–279. *Figs. 50–52.* 1918.—This title is used to include root rots caused by *Marasmius sacchari*, *Himantia stellifera*, *Odontia saccharicola* and other fungi not named. Losses from root-rots are general all over the island and range from negligible amounts to 50 per cent of the crop. Preventive measures are discussed including resistant varieties, care in obtaining seed pieces, good methods of culture and rotation of crops.—*F. M. Blodgett.*

1085. Stevenson, John A. **Marchitez y falta de desarrollo en las plantaciones de cacao de la Republica Dominicana. [Poor condition of cacao in Santo Domingo.]** Rev. Agric. Santo Domingo 14: 265–273. 1918.—During a trip of several weeks in Santo Domingo the author found cacao plantations were in poor condition. The usual diseases of cacao were not found to be so destructive as were poor conditions of planting, cultivating and fertilizing which lead to a weak condition of the trees and attacks by wound parasites.—*F. M. Blodgett.*

1086. Stevenson, John A. **La enfermedad nueva de la caña. [A new disease of sugar cane.]** Rev. Agric. Puerto Rico 1: 18–25. *Fig. 1–2.* 1918.—A new sugar cane disease is described which has rapidly spread to most of the cane growing regions on the north and south sides of the island. This disease named "matizada" or mosaic produces light yellowish stripes with irregular margins in the cane leaves, dwarfs the plant, causes the stalks to shrivel and in extreme cases to canker. It is carried by pieces of stalk from diseased plants when used in planting new fields. It appears to be a typical mosaic disease as no fungi, insects, fertilizers or soil conditions were found to cause the disease. Means of spread other than use of diseased stalks in planting have not been determined. Work aimed at securing resistant varieties has been undertaken with good prospects.—*F. M. Blodgett.*

1087. Stevenson, John A. **Cuarentena de plantas en Puerto Rico. [Quarantine of plants in Porto Rico.]** Rev. Agric. Puerto Rico 1: 213–216. 1918.—In a short review of the quarantine law of Porto Rico, it is stated that the first law was passed in 1905, a new law was passed in 1910, added to in 1914 and amended in 1915. A summary is also given of the number of inspections made and the insects and diseases intercepted.—*F. M. Blodgett.*

1088. Stevenson, John A. **Catalogo de las enfermedades fungosas y no-parasiticas que atacan las plantas economicas de Puerto Rico. [Catalog of the fungous and non-parasitic diseases of cultivated plants in Porto Rico.]** Rev. Agric. Puerto Rico 2^1: 19–27. 1918. Same title. *Ibid.* 2^2: 23–33. 1919.—A list of the more important diseases of economic plants of Porto Rico arranged alphabetically by hosts with short descriptions of symptoms and methods of control.—*F. M. Blodgett.*

1089. Stevenson, John A. **La enfermedad del mosaico del tabaco. [Mosaic disease of tobacco.]** Rev. Agric. Puerto Rico 2^1: 39–44. 1918.—This disease is very common in Porto Rico. A review of the symptoms, cause and control is given.—*F. M. Blodgett.*

1090. Tisdale, W. H. **Physoderma disease of corn.** Jour. Agric. Res. 16: 137–154. *Pl. A–B* (*colored*) and *10–17.* 1919.—*Physoderma zeamaydis* on *Zea mays* has been present in the United States at least since 1912. Its known distribution is roughly the southeastern quarter of the States which include much of the corn belt of the Mississippi Valley. The region where the disease is of importance is the seven southeastern states. In occasional fields

the loss on account of the disease has been as high as 6 to 10 per cent but in the infested area as a whole the damage has not been great.—All the varieties of maize seem to be equally susceptible to attack and teosinte (*Euchlaena mexicana*) is also affected.—Lesions occur on blades, sheath and culm and at first are very similar to those of rust caused by *P. sorghi*.—Recently matured sporangia germinate readily in a film of water if supplied abundantly with oxygen and if the temperature is kept between 23° and 30°. From 20 to 50 zoospores are formed. After 1 to 2 days the zoospores germinate by sending out very fine fibrous hyphae which penetrate the epidermal cells. Within two days penetration has been accomplished and large swollen fungous cells may be formed.—The organism seems to be an obligate parasite. Artificial inoculations in greenhouse and field resulted in infection, the incubation period being 10 days.—Sporangia are resistant to low temperature (−8°F.) and if kept moist retain their vitality over winter.—The fungus is disseminated by the wind and probably by other agencies, e.g., flowing water, insects and various animals.—No definite means of control is known but sanitation, rotation and disease resistant varieties offer possibilities.—*D. Reddick.*

1091. VAN HALL, CONSTANT JOHAN JACOB. **De bescherming der cultuurgewassen tegen nieuwe ziekten en plagen uit het buitenland. [Protection of cultivated plants against new diseases and enemies from foreign countries.]** Teysmannia 29: 62–95. 1918.

1092. VENKATA RAO, M. K. **The pest act against koleroga and its application.** Mysore Agric. Calender 1919: 17–20. 1919.—Statement of the pest act of October, 1917 which compels owners of areca palm to spray their groves to control Koleroga or rot disease of the nuts caused by [*Phytophthora arecae*]. Enforcement of the act in one village comprising about 50 acres resulted in complete suppression of the disease.—*D. Reddick.*

1093. VINCENS, F. **Quelques maladies des plantes cultivées au Pará, Brésil. [Some disease of the cultivated plants of Para, Brazil.]** Bull. Soc. Path. Veg. France 5: 45–55. *Fig. 1–5.* 1918.—Leaf burn of tobacco caused by *Cercospora nicotianae* is described and figured. Prompt and careful picking of the leaves and burning of the badly diseased ones is recommended to reduce loss. Leaf spot of rice caused by *Cercospora orizae* is described and figured but not considered serious. Red leaf spot of sugar-cane occurs but is negligible.—A disease of the branches of cacao caused by *Lasiodiplodia theobromae*, a witches'-broom of unknown cause, a leaf spot caused by *Phyllosticta theobromicola* n. sp. and a disease of young fruit of the same host due to *Gloesporium theobromicolum* n. sp. are described, and the fungi figured. A disease of the leaves of *Anacardium occidentale* caused by *Dendrodochium paraense* n. sp. is also described and figured.—*C. L. Shear.*

1094. VINCENS, F. **Nécrose des feuilles de pin due au Pestalozzia truncata Leveillé. [Necrosis of pine leaves caused by Pestalozzia truncata.]** Bull. Soc.Path. Veg. France 5: 27–31. *3 figs.* 1918.—A necrosis of leaves of *Pinus sylvestris* beginning toward the upper end of the leaf and finally causing the death of the terminal part is described. Microscopic examination of the diseased tissue showed fungous hyphae present. The diseased leaves in moist chamber produced a *Pestalozzia*. This is referred to *P. truncata* Lev. and is believed to be the same as the later *P. hartigii* Tub., also found on pine. The parasitism of the *Pestalozzia* found and its causal relation to the necrosis is regarded as probable, though the few inoculation experiments made gave negative results.—*C. L. Shear.*

1095. WEIR, JAMES R. **Forest disease surveys.** U. S. Dept. Agric. Bull. 658. *23 p., 22 fig.* 1918.—Detailed methods, based on experience, are presented for conducting forest disease surveys in conjunction with timber-survey projects. Such surveys will furnish data of value in conducting future sales of the areas in question.—Maps indicating principal areas of infection can be compiled from survey data and are of value in the appraisal, marking and general administration of the area.—*D. Reddick.*

1096. Weir, James R., and Ernest E. Hubert. **A study of heart-rot in western hemlock.** U. S. Dept. Agric. Bull. 722. *37 p., 13 fig.* 1918.—Western hemlock (*Tsuga heterophylla*) is now coming into use but there is prejudice against it due primarily to susceptibility to heart rot and rapid deterioration after cutting.—*Echinodontium tinctorium* is the cause of practically all the heart rot in the Northwest. The fungus and stringy, brown, heart-rot it produces are described and illustrated in detail. The fungus enters mainly through branch stubs.—In general, the sites and associations of western hemlock are favorable to the development of decay, the moisture relation being of seemingly greatest importance. In addition, the absence of any great amount of resin, the tolerant habit of the species, the early and abundant formation of branch stubs and the large number of spores produced by the fungus, are likewise factors in the rapid and extensive development of decay.—The environmental factors of the river bottoms are more favorable to early and extensive decay than are those of the southwestern slopes.—Two means of control are suggested (1) a rigid sanitation clause in timber-sale contracts providing for destruction by fire of all infectious cull material including infected trees usually left standing, and (2) pathological surveys to determine proper cutting age of hemlock.—*D. Reddick.*

1097. Wennink, C. S. **De gevolgen der bladrolziekte bij aardappelen.** [Control of leaf-roll of potatoes.] Tijdschr. Plantenz. 24 (Bijblad): *1-4.* *Fig. 1-5.* 1918.—The author conducted an experiment over one season, the results of which substantiate the statement by Quanjer that potatoes free from the leaf-roll disease can be produced by careful seed selection and by growing on non-infested land.—*G. F. Puttick.*

1098. Wormald, H. **A withertip of plum trees.** Ann. Appl. Biol. 5: 28-59. *Pl. 7-9.* 1918.—Disease is characterized by wilting and death of the tips of young twigs, the infection originating in a leaf some distance back from the tip. *Monilia cinerea* develops in such leaves and twigs during the following autumn and spring. This organism in pure culture was used in inoculation experiments and its pathogenicity proved for plum flowers, and wounded fruits. In some instances cankers were formed about the base of the flowering spur. Infection did not occur on leaves nor on unwounded fruits. Apple flowers were artificially infected but in no instance did the fungus extend into the spurs.—This strain of the fungus does not differ morphologically from the one associated with blossom wilt of apples but they are regarded as biologic forms since they differ in their power of causing infection of apple and can be distinguished by cultural and biochemical means.—Destruction of diseased parts is recommended as a control measure.—*D. Reddick.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Henry Kraemer, *Editor*

1099. Anonymous. **Cinchona experiments in the Philippines.** Chem. and Druggist 91: 139. 1918.—Seed of *Cinchona Ledgeriana* has been sent from Madras to Luzon where an attempt at cinchona cultivation is to be inaugurated.—*E. N. Gathercoal.*

1100. Anonymous. **Dutch East Indian essential oils.** Chem. and Druggist 91: 6-7. 1918.—Cajuput oil, from the leaves of *Melaleuca Leucadendron*, is produced in about 500 distilleries in the Moluccas, mostly by natives in charge of Chinese. Adulteration with kerosene or benzene is not uncommon. The green color, so much desired, is heightened by placing strips of copper in the stills. In 1915, nearly 80,000 kilos were exported, 16,000 of which went to the United States, and 60,000 kilos are used locally in Java.—Citronella oil, from the cultivated grass, *Andropogon Nardus*, is distilled mostly in Java. 233,326 kilos were exported in 1915, 63,560 kilos coming to the United States while nearly 516,000 kilos were exported in 1917, the United States receiving 205,000 kilos.—Lemongrass oil, from *Cymbopogon citratus*, is produced in relatively small quantities, for in quality it cannot compete with the Cochin and Reunion lemongrass oils.—Cananga or ylang-ylang oil, from the fresh flowers of the tree, *Artabotrys odoratissima*, is produced from a large plantation on the island of Bantam,

350 kilos of flowers yield 1 kilo of oil. The quality is not as good as the Manila ylang-ylang oil.—Patchouli oil, from *Pogostemon Heyneanus*, is distilled to some extent on the east coast of Sumatra.—*E. N. Gathercoal.*

1101. ANONYMOUS. **Indian drug research.** Chem. and Druggist 91: 5. 1918.—By resolution before the Bombay Legislative Council steps have been taken to start a pharmacological laboratory or research institute in medicine for scientific experiment with and research into indigenous drugs. The Government encouraged the idea and established a strong committee to prepare a scheme for the development of the institute.—*E. N. Gathercoal.*

1102. ANONYMOUS. **Quinine in India.** Chem. and Druggist 91: 57. 1918.—India produced sufficient cinchona bark and quinine for her own needs until 1892. From 1892 to 1901 she produced about 250,000 pounds of bark annually and imported as much more. By 1910 the annual production had increased to 400,000 pounds of bark annually. In 1917–18, 55,000 pounds of quinine was produced at the Madras factory and the total production of bark exceeded 2,000,000 pounds. Government has secured a tract of 400 square miles in Burma for cinchona plantation. It now has 1188 acres in cinchona, occupied as follows: *Cinchona officinalis* 13,000 trees, *C. Ledgeriana* 876,000 trees, hybrids 610,000 trees. However, only 87,000 pounds of bark were harvested last year and it will be ten to fifteen years before the whole plantation comes into bearing. Eventually India can not only supply herself but the Empire with quinine.—*E. N. Gathercoal.*

1103. ANONYMOUS. **Quisqualis indica, a substitute for Santonica.** Devenport.—Schweiz. Apoth. Zeitg. 56: 522. 1918.—The plant which furnishes this substitute belongs to the Combretaceae and grows wild in the tropical regions of Asia, America, and Africa. Only the seeds are used in medicine. The best drug comes from the province of Szetchouan which furnishes it in large quantities. The seeds contain an active principle resembling santonin and possess anthelmintic properties. The maximum dose is 7.5 g. for adults.—*H. Kraemer.*

1104. DOMINGUEZ, J. A. **Cultivation of medicinal plants.** Semana Medica (Buenos Ayres), through Jour. Amer. Med. Assoc. 72: 461. 1919.—Dominguez, director of the Institute of Botany and Pharmacology of the University of Buenos Aires, replies to an inquiry from the government in regard to the feasibility of cultivating the cinchona in Argentina. He advises starting with the *C. succirubra* as the hardiest species. If this succeeds, then others could be tried. Near the equator a high altitude is desirable. In Java the official plantations are at 1230 to 2350 meters but some private plantations are as low as 550 meters. All known plantations are above this altitude except in Australia where, although at an altitude of only 33 meters, the bark has yielded 6.5 per cent of alkaloids. The *C. Calisaya* seems to do best at an altitude of 2000 meters. With higher altitudes the levorotatory alkaloids seem to increase while the proportion of dextrorotatory decreases. The cinchona plants can bear a temperature of 2°C. but at freezing point or below they are seriously injured, as also with very high temperatures. The admissible range is from 4 to 33°C. that is, a minimal average of 15° and a maximal average of 27°C. The rainfall has to be at least 1200 mm.; in the Java plantation the annual precipitation is 2300 to 4500 mm. with a maximal humidity of 96 per cent. There is no yield the first four years.—*Wm. B. Day.*

1105. EWING, C. O., AND E. E. STANFORD. **Botanicals of the Blue Ridge.** Jour. Amer. Pharm. Assoc. 1: 16–26. 1919.—This paper gives an account of a visit to the Blue Ridge region for the purpose of making a survey of the drug plants growing there and to make a special study of the conditions of the drug trade of this locality, the methods employed in the collection, drying, preservation and distribution. The effect of the past war and the future of this industry are also discussed.—The paper is characterized by the many items of interest concerning the drug collection in this vicinity as to the actual existing conditions. Illustrated with a series of snap shots of the native drug collectors, warehouses, etc.—*A. Hogstad, Jr.*

1106. Guérin, M. **Adulteration of Cretan dittany with Calamintha candidissima.** Rept. Pharm. 30: 49. 1919.—Cretan dittany (*Origanum dictamnus*), a Labiate plant, is little used in France and only occurs in the Codex in the formula for "baume de Fioravanti." This plant, a native of Crete, is official in the pharmacopoeias of Denmark, Spain, Mexico, and Sweden. It can no longer be procured in France, but there is found in commerce, under the same name, another plant of the same family, *Calamintha candidissima*, which grows in Algeria.—The Cretan dittany is characterized by reddish flower stalks, broadly ovate leaves, the lower being petiolate and the upper sessile, both covered with a dense whitish tomentum. The flowers form pedunculate spikes surrounded by almost glabrous reddish bracts, 7 to 9 mm. in length. Under a lens the leaves are seen to be covered with glandular hairs.—The Cretan dittany possesses an aromatic odor like that of thyme. It has an acrid pungent taste. The hairs which cover both surfaces of the leaves are long and easily detached by rubbing. The glandular hairs, abundant on the upper epidermis, are bicellular with an eight-celled head where the secretion accumulates under the much distended cuticle. These glands are accompanied by a large number of very small secreting hairs having a unicellular head.—*Calamintha candidissima*, the article which reaches France, consists of short branches and the leaves are whiter than those of Cretan dittany and the odor is less delicate. The hairs which cover the leaves are less easily rubbed off; they are multicellular like those of Cretan dittany, but are shorter and have thinner walls. Their ramifications are more numerous and more complex. The secreting hairs are of two kinds as in *Origanum dictamnus* but larger, especially on the ventral epidermal layer. The secreting head may contain as many as sixteen cells.—To sum up, the leaves of *Calamintha candidissima* are always whiter than those of Cretan dittany; they never have reddish bracts; their odor is less delicate.—*H. Kraemer.*

1107. Hamilton, H. C. **Digitalis leaves: effect on activity of temperature in drying.** Amer. Jour. Pharm. 3: 177–183. 1919.—The author first records the results of several workers in regard to the variability of digitalis leaves and their preparations. It is noted that the variations are as high as 400 to 500 per cent. Included with these results are brief descriptions of the methods adopted by the various workers for the drying, preservation and extraction of the digitalis leaves.

The author performed a series of experiments to demonstrate the correctness of the statement made in connection with the drying of digitalis submitted to the Medical Department of the Army, which was grown wild in Oregon, that unless the drying was accomplished in an oven at a temperature ranging from 75 to 90°, it was practically worthless.

The results of the experiments are as follows:—That oven drying has no advantage over a reasonably rapid air drying of digitalis leaves. That the drying causes a marked deterioration when conducted in an oven at a high temperature. That the fresh drug has greater toxicity than the dried drug. That no products more highly toxic than those present in the crude drug are developed during the process of drying.—Two series of tables in tabulated form of the assay results, obtained on the fresh drug, the oven dried and sun-air dried drug are given.—*A. Hogstad, Jr.*

1108. Holmes, E. M. **Note on Indian Belladonna.** Pharm. Jour. 102: 2. 1918.—On the cultivation, curing and packing of Indian belladonna, which is evidently identical with *Atropa Belladonna*. The fact that the plants are grown at a fairly high elevation, 6500 feet, and in rich virgin soil accounts for the high percentage of alkaloid.—*E. N. Gathercoal.*

1109. Holmes, E. M. **Strophanthus Semina, B. P.** Pharm. Jour. 102: 33–34. 1918.—It is pointed out that for some years past it has been impossible to obtain pure seed of *S. Kombe* in commerce. Dealers object to importing strophanthus seed in their pods because of the increased cost of freight and handling and as the seeds of *S. Kombe* are not distinguishable with the naked eye from the seeds of numerous other species of S. of unknown value, seeds of lower price are sold as genuine Kombe seed or are admixed with just enough Kombe seed to "swear by." The danger of this carelessness about one of the most valuable heart remedies, when given in proper dose, but which is a dangerous heart poison in too large a dose, is leading to results that may easily prove disastrous. In view of the limited geographical

range of *S. Kombe*, the use of *S. hispidus* which is the only other known species which gives the green reaction for strophanthin and which has a much wider range, might be ordered, as was done in the 9th revision of the U. S. P.—*E. N. Gathercoal.*

1110. JAVA CINCHONA COMPANIES. **Report of West Java Cinchona Planting Co.** Chem. and Druggist 91: 50. 1918.—Cinchona bark production in Java was not as good in 1917 as in 1916. The temperature was unfavorable and fungoid diseases caused much trouble. The quinine content dropped from an average of 7.14 to 6.7 per cent genuine sulphate; also the price was lower—10.574 cents against 11.366 cents in 1916. The sales of cinchona bark in Amsterdam were 7,893,362 kilos in 1916 and 5,821,250 kilos in 1917, while the year end stocks were reduced from 47,000 bales to 1384 bales. Quinine manufacture in Java has much increased. An editorial (Chem. and Druggist 91: 53. 1918) states that for the period 1910–1913 the world's production of cinchona bark was 25,225,000 pounds per annum, of which nearly 23,000,000 pounds is credited to Java, 2,000,000 to India and Ceylon and less than 500,000 to other countries.—*E. N. Gathercoal.*

1111. MENDIOLA, N. B. **A study of Philippine bast fibers.** Philippine Agric. and Forester 6 (1917): 6–39. *4 pl.*—Botanical studies of *Abroma angusta, Kleinhofia hospita, Melochia umbellata, Urena lobata, Hibiscus sabdariffa, Malachra fasciata, M. capitata, Triumfetta bartramia, Grewia multiflora,* and *Wikstroemia ovata;* microscopic studies of the structure of the fibers; and observations on their dimensions and tensile strength, the effect of seasonal rettings. and the commercial value of the various fibers have led to the conclusion that the fiber of *P. arborescens* cannot be extracted by water-retting, that *S. grandiflora* is not a textile fiber, and that none of the species studied can be profitably grown under the labor conditions and methods of manufacture prevailing in the Philippines at the present time. [Abst. in: Exp. Sta. Rec. 8: 739. 1918.]—*A. Hogstad, Jr.*

1112. TSCHIRCH, A., AND F. WOLTER. **Determination of the chemical value of digitalis.** Schweiz. Apoth. Zeitg., 56. 470–474, 495–498, 512–514. 1918.—The authors have experimented with four species of digitalis leaves. Their results show that the best methods of extraction is that of Reed-Vanderkleed but that it requires much time, 6 days. For solvents they used ether, acetic ether, absolute alcohol, amyl alcohol, benzene, carbon tetrachloride, chloroform, and acetone. Chloroform dissolves only part of the active substances contained in the drug; with absolute alcohol all of the active substances pass into the extract; benzene does not dissolve all of them; acetone is the best solvent for determining the chemical value of digitalis.—The authors employed a modified method of Keller, the leaves of the digitalis being first subjected for extraction by ether in order to remove the oils and chlorophyl. After removing the ether by distillation, the leaves were extracted with absolute alcohol. After purification with lead, the entire glucosides were isolated by acetone, the acetone being separated from the liquid by the addition of sodium chloride.—In this manner they obtained a complete exhaustion of the drug and the extract thus obtained has been called pandigiton and is said to possess all the physiological properties of digitalis. *H. Kraemer.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

GENERAL

1113. SCHMIDT, C. L. A., AND D. R. HOAGLAND. **Table of P_H, H^+ and OH^- values corresponding to electromotive forces determined in hydrogen electrode measurements, with a bibliography.**—Univ. California Publ. Physiol. 5: 23–69. 1919.—An extensive set of tables with a bibliography of 467 titles and notes upon the technique of making electrometric determinations of hydrogen or hydroxyl ion concentrations. The tables give the required equivalent of the potential of either the normal or tenth-normal KCl-calomel electrode and cover

a range of PH values from 0.034 to 14.032. Values are calculated on the temperature basis of 25°C. and a table of factors is given for converting readings made between 18° and 30°C. The bibliography gives a list of works dealing with the theory and use of the methods and with their applications to various types of investigation. The notes describe the basis upon which the computations were made and discuss certain important questions in technique.—*H. S. Reed.*

PROTOPLASM, MOTILITY

1114. Levi, Guiseppe. **Considerazioni sulla costituzione fisica del citoplasma desunte da nuovi dati morfologici sulle cellule coltivate in vitro. [Cells cultivated in vitro and the physical constitution of protoplasm.]** Atti R. Accad. Lincei, Rend. V, Cl. Sci. Fis., Mat. e Nat. 27[2]: 136–140. 1918.

DIFFUSION, PERMEABILITY

1115. Harris, J. Arthur. **On the osmotic concentration of the tissue fluids of Phanerogamic epiphytes.** Amer. Jour. Bot. 5: 490–506. 1918.—The osmotic concentration of the tissue fluids of various epiphytes is much lower than that of terrestrial vegetation and the osmotic concentration of the species of epiphytes of Jamaica is much lower than those of Florida. [See Bot. Absts. 1, Entry 829.]—*R. W. Webb.*

MINERAL NUTRIENTS

1116. Shive, John W., and William H. Martin. **A comparison of salt requirements for young and for mature buckwheat plants in water cultures and sand cultures.** Amer. Jour. Bot. 5: 186–191. 1918.—Employing the usual methods, the authors conclude that the salt proportions producing the best physiological balance differ in the young and mature stages, and differ also as between water and sand cultures.—*R. W. Webb.*

1117. Toole, E. H., and W. E. Tottingham. **The influence of certain added solids upon the composition and efficiency of Knop's nutrient solution.** Amer. Jour. Bot. 5: 452–461. 1918.—The weight of dry barley tops was increased by the addition of $Fe(OH)_3$ to the solution, depressed by carbon black, and unaffected by $H_2S_2O_3$, whereas the weight and length of roots were little affected in each case. The growing plants exerted a neutralizing effect on the solutions and the weights of dry tops were inversely proportional to the hydrogen-ion concentrations. The higher application of $Fe(OH)_3$ removed much of the phosphorus of the solution, but yielded the best culture in yield and appearance.—*R. W. Webb.*

1118. True, Rodney H., Otis F. Black, and James W. Kelly. **Ash absorption by spinach from concentrated soil solutions.** Jour. Agric. Res. 16: 15–25. 1919.—Heavy application of mineral fertilizers as single salts and in complete mixtures were made on beds of spinach (*Spinacia oleracea*) at the Virginia Experiment Station. The best growth resulted when the basic complete mixture was used ($NaNO_3$, K_2SO_4, basic slag, dried blood, tankage). Growth was fair with acid phosphate or Na_2SO_4, poor with heavy applications of NaCl, $NaNO_3$ or acid complete mixture ($(NH_4)_2SO_4$, acid phosphate, KCl, dried blood, tankage), and poorest with KCl. There was no relation between ash content and growth as the plants showing best and poorest growths, with basic mixture and KCl respectively had the lowest ash contents. The highest total ash in the tops occurred when fertilized with NaCl, manure, $CaCO_3$, and acid phosphate, the lowest with KCl and basic mixture. For the roots the highest ash occurred with acid phosphate and manure, the lowest with KCl and NaCl. The amounts present of the Si, K, and Na showed wide fluctuation under different fertilizer treatments, the other element showed little variation. Relative to dry weights, manganese was the only element regularly present in greater quantities in the roots than in the tops. Magnesium was always present in greater quantities than calcium in both roots and tops except when the plants were fertilized with $CaCO_3$.—*Otis F. Curtis.*

PHOTOSYNTHESIS

1119. OSTERHOUT, W. J. V. **A simple method of demonstrating the production of aldehyde by chlorophyll and by aniline dyes in the presence of sunlight.** Amer. Jour. Bot. 5: 511–513. 1918.—A method for obtaining aldehyde from chlorophyll in sunlight is described. Aldehyde is also observed when aniline dyes are substituted for chlorophyll. From his experiments, the author believes that the aldehyde is formed by the decomposition of chlorophyll rather than by the decomposition of CO_2.—*R. W. Webb.*

METABOLISM (GENERAL)

1120. APPLEMAN, CHARLES O. **Special growth-promoting substances and correlation.** Science 48: 319–320. 1918.—The author concludes that the potato tuber contains a limited amount of a special growth-promoting substance, and that weak, slender sprouts result from a deficiency of this material. [See Bot. Absts. 1, Entry 283.]—*R. W. Webb.*

1121. DENIS, MARCEL. **Sur quelques thalles d'Aneura dépourvus de chlorophylle. [Concerning certain thalli of Aneura devoid of chlorophyll.]** Compt. Rend. Acad. Sci. Paris 168: 64–66. *Fig. 1–2.* 1919.—See Bot. Absts. 2, Entry 982.

1122. MARSH, C. DWIGHT, AND A. B. CLAWSON. **Stagger grass (Chrosperma muscaetoxicum) as a poisonous plant.** U. S. Dept. Agric. Bull. 710. *15 p., fig. 1–8.* 1918.—That stagger grass contains a substance very toxic to animals is confirmed by experiments with cattle and sheep.—*R. W. Webb.*

1123. POTTER, R. S., AND R. S. SNYDER. **The organic phosphorus of soil.** Soil Science 6: 321–332. *Fig. 1–2.* 1918.—The organic phosphorus of the soil is studied, particular attention being devoted to its distribution, nature, and acid hydrolysis. The authors conclude that organic phosphorus is not due to colloidal clay, and that the increase of phosphorus in the acid-extracted soil over the non-extracted soil is not due to increased solubility of phytin, inasmuch as phytin is extracted to a negligible extent with 1 per cent hydrochloric acid.—*R. W. Webb.*

1124. SWANSON, C. O., AND E. L. TAGUE. **Determination of acidity and titratable nitrogen in wheat with the hydrogen electrode.** Jour. Agric. Res. 16: 1–13. 1919.—The hydrogen ion concentrations in the extracts of ground wheat were determined by means of the hydrogen electrode. The substances produced when wheat is digested in water are not ionized until an alkali has been added. The amount of these substances produced, up to a certain limit, bears a definite relation to the time and temperature used in the digestion.—*Henry Schmitz.*

METABOLISM, RESPIRATION

1125. APPLEMAN, CHARLES O. **Respiration and catalase activity in sweet corn.** Amer. Jour. Bot. 5: 207–209. *Fig. 1.* 1918.—Respiration in sweet corn in the milk stage is very high when the corn is pulled, but decreases rapidly with storage. The author finds that catalase activity shows a corresponding decline with storage which is almost directly proportional to the decline of respiration. Potato tubers exhibit a similar relation.—*R. W. Webb.*

ORGANISM AS A WHOLE

1126. DANIEL, LUCIEN. **Cultures maraîchères expérimentales au bord de la mer. [Market gardening experiments on the sea coast.]** Compt. Rend. Acad. Sci. Paris 168: 116–118. 1919.—See Bot. Absts. 3, Entry 80.

1127. GREAVES, J. E. **Azofication.** Soil Science 6: 163–217. *Fig. 1–2.* 1918.—The morphology and physiology of *Azotobacter* are extensively studied under the influence of various factors, and the experimental data show the important part that *Azotobacter* plays in maintaining the nitrogen balance of the soil.—*R. W. Webb.*

1128. Osterhout, W. J. V. **Endurance of extreme conditions and its relation to the theory of adaptation.** Amer. Jour. Bot. 5: 507–510. *Fig. 1.* 1918.—From the fact that a species of *Tradescantia* lived for two years without soil or water, then grew vigorously on being placed in a saturated atmosphere, and finally grew slightly on being submerged, the author concludes that the explanation of this case, as well as of others must be based on physical or chemical conditions of the protoplasm without reference to direct adaptation.—*R. W. Webb.*

1129. Stakman, E. C., and M. N. Levine. **Effect of certain ecological factors on the morphology of the urediniospores of Puccinia graminis.** Jour. Agric. Res. 16: 43–47. 1919.—See Bot. Absts. 2, Entry 1081.

1130. Williams, Katherine A. **A botanical study of skunk-cabbage, Symplocarpus foetidus.** Torreya 19: 21–29. *Pl. 1–2, fig. 1–13.* 1919.—See Bot. Absts. 2, Entry 981.

GROWTH, DEVELOPMENT, REPRODUCTION

1131. Appleman, C. O. **Physiological basis for the preparation of potatoes for seed.** Maryland Agric. Exp. Sta. Bull. 212: 80–102. *Fig. 1–11.* 1918.—The author extensively studies the production and growth of sprouts on the potato tuber, as influenced by various factors, concluding that internal inhibitory influences play an important rôle in this phenomenon. He suggests certain principles to be adhered to in the preparation of seed for the practical growing of potatoes.—*R. W. Webb.*

GERMINATION, RENEWAL OF ACTIVITY

1132. Andrews, F. M., and C. C. Beals. **The effect of soaking in water and of aeration on the growth of Zea Mays.** Bull. Torrey Bot. Club 46: 91–100. *Fig. 1–5.* 1919.—Experiments were conducted to ascertain the proper length of time to soak the grains for maximum growth; 12 hours was the optimum. A study was also made of the results of puncturing the grains before soaking and of the effect of punctures in different parts of the grain; under proper conditions puncturing accelerates growth. Plants grown in water cultures that were aerated showed marked improvement over non-aerated, especially when the temperature was kept at a low enough point.—*P. A. Munz.*

REGENERATION

1133. Reed, H. S., and F. F. Halma. **On the existence of a growth inhibiting substance in the Chinese lemon.** Univ. California Publ, Agric. Sci. 4: 99–112. *Pl. 3–6.* 1919.—Discussion of a hypothetical growth inhibiting substance in the Chinese lemon, and of its effects upon the development of new shoots on cuttings. The theory is advanced that the shoots developing nearest the apex form a substance which is capable of inhibiting the growth of subapical buds on the vertical stem. The dominant influence of the apical buds may be prevented from reaching lower buds by notching the phloem layer just above each bud. When the upper part of the cuttings was enclosed in a plaster cast, the development of buds on that portion was prevented, but lower buds developed. After removal of the casts the apical buds grew and showed an inhibitory action on the growth of the lower shoots previously produced.—Horizontal branches or cuttings produced shoots only from the upper side. Rotation of such a cutting after shoots have appeared on the dorsal side permits new shoots to appear on what was previously the ventral side of the cutting. In horizontally placed shoots the inhibiting substance appears to settle to the ventral side of the shoot.—*H. S. Reed.*

TEMPERATURE RELATIONS

1134. Ellenberger, H. B. **A study of bacteria in ice cream during storage.** Cornell Univ. Agric.Exp.Sta.Mem. 18:331–361. 1919.—Plate counts of ice cream, made immediately after the ice cream was frozen, show a higher bacterial count than the ice cream mixture before freezing. This is probably due to the breaking up of clumps of organisms. There is no very

radical change in number of bacteria with storage. There is a slight decrease the first few days followed by slight increase up to about the tenth day and then a gradual decrease until at the end of 90 days only 30 per cent of the original number remain. Agar plates gave higher counts than gelatine plates and the addition of litmus to the media decreased the total number of bacteria.—*L. Knudson.*

1135. PANTANELLI, E. **Sul la resistenza delle plante al freddo.** [**On the resistance of plants to cold.**] Atti R. Accad. Lincei, Cl. Sci. Fis., Mat. e Nat., Rend. V, 27[1]: 126–130, 148–153. 1918.—Pot experiments with nutrient solutions were made with grain, beets, sunflowers, tomatoes and maize.—The removal of heat through the lowering of temperature is the essential cause of death from cold and to this is opposed the resistance of the organs, while the formation of ice is an accessory process. The resistance to freezing is not related to the concentration of the cell sap, nor to its acid or salt content, but to the proportion of sugar that the cells succeed in conserving during the cooling.—*F. M. Blodgett.*

TOXIC AGENTS

1136. DEATRICK, E. P. **The effect of manganese compounds on soils and plants.** Cornell Univ. Agric. Exp. Sta. Mem. 19: 371–402. 1919.—Wheat grown in distilled water containing 20 parts per million of manganese, as manganese sulfate, showed injury, particularly in growth of roots. In a nutrient solution, distinct stimulation of growth was noted with manganese sulfate at a concentration of manganese as high as 400 parts per million. At 10 parts per million the increase was 100 per cent. Manganese chloride and manganese carbonate gave like results. In soil culture (Dunkirk clay loam), wheat grown 7½ months showed a decided increase in yield of grain with 10 or 25 parts per million of manganese. The addition of calcium carbonate along with manganese sulfate seems to delay the heading of wheat. Leaves injured by manganese show relatively high manganese content. Manganese increases oxidizing power of the soil.—*L. Knudson.*

1137. HARTWELL, BURT L., AND F. R. PEMBER. **The presence of aluminum as a reason for the difference in the effect of so-called acid soil on barley and rye.** Soil Science 6: 259–279. *Pl. 1; fig. 1–2.* 1918.—With rye and barley plants as indicators, the active factor for the different influence on plants in acid soils proved to be aluminum, and the results indicate that phosphating and liming acid soils may be advantageous in precipitating aluminum, as well as acting as a nutrient and a reducer of acidity.—*R. W. Webb.*

1138. LIPMAN, C. B., AND W. F. GERICKE. **Copper and zinc as antagonistic agents to the "alkali" salts in soils.** Amer. Jour. Bot. 5: 151–170. *Fig. 1–2.* 1918.—The data obtained from experiments using Berkeley adobe soil or Oakley sand support the view that the heavy metals exert an antagonistic action to alkali salts for crop plants grown in pots and it is implied that the phenomenon may be of great practical importance.—*R. W. Webb.*

1139. LUDWIG, C. A. **The influence of illuminating gas and its constituents on certain bacteria and fungi.** Amer. Jour. Bot. 5: 1–31. 1918.—Various bacteria and fungi fail to exhibit any marked sensitiveness to small amounts of illuminating gas or its constituents, the relatively slight action observed depending on the specific organism and the constituents concerned. The effect of the illuminating gas is considered to be due to the sum of the effects of the constituents and to the deficiency of oxygen. No organism acquired a tolerance to the various gases, but, on the other hand, showed a slight but gradual decline in vigor.—*R. W. Webb.*

1140. LUDWIG, C. A. **The effect of tobacco smoke and of methyl iodide vapor on the growth of certain organisms.** Amer. Jour. Bot. 5: 171–177. 1918.—Tobacco smoke appears to be more or less toxic to all the organisms studied—unwashed smoke being more toxic than washed smoke. Methyl-iodide vapor induces a great retardation at first followed by a vigorous growth unless the vapor is of such concentration as to sterilize.—*R. W. Webb.*

1141. Lund, Barbara Lee. **The toxic action of KCN and its relation to the state of nutrition and age of the cell as shown by Paramecium and Didinium.** Marine Biol. Bull. 35: 211–231. *Fig. 1–3.* 1918.

MISCELLANEOUS

1142. Anonymous. **Outlook for kelp products.** Pacific Fisherman 17[1]: 46. 1919.—Note on alginic acid.—*T. C. Frye.*

1143. Brooks, Charles, J. C. Cooley, and D. F. Fisher. **Apple scald.** Jour. Agric. Res. 16: 195–217. *Fig. 1–11.* 1919.—Apple scald is due to the long continued action of more or less abnormal storage conditions, conditions that cause the production or prevent the elimination of certain waste products. Most varieties of apples may be exposed to unfavorable conditions for several weeks without developing scald and without showing any tendency to the disease if later stored under nearly normal conditions, but they finally reach a certain critical period at which time they are not scalded, yet have developed a tendency to scald that can not be radicated by removing the agencies that were originally responsible for the trouble.—Apple scald is due to volatile or gaseous substances other than carbon dioxid that are produced in the metabolism of the apple. They can be carried away by air currents or taken away by various absorbents, such as excelsior, sawdust, animal charcoal and by wrappers impregnated with various fats. A constant air movement of from 0.12 to 0.25 mile per hour has always either entirely prevented apple scald or has reduced it to a negligible quantity. The intensity of air movement apparently is more important than the continuity, and circulation of air more important than air renewal. Previous work by the authors is summarized, and additional data bearing on certain phases of the question are included.—*D. Reddick.*

1144. Shreve, Edith Bellamy. **The imbibition of water by gelatine.** Science 48: 324–327. 1918.—This work emphasizes the fact that, when studying the absorption of water by gelatine and other colloidal jellies, the identical history of water content and of water-loss must be carefully considered, also that the greatest shrinking and swelling take place along the axis which is perpendicular to the largest evaporating surface.—*R. W. Webb.*

1145. Waksman, Selman A. **The occurrence of Azotobacter in cranberry soils.** Science 48: 653–654. 1918.—*Azotobacter* and *Actinomyces* filaments are found in the soil from a cranberry bog that has previously been limed, but are absent from similar soil that has not been limed. A hydrogen-ion determination is made with each soil extract with the following results: limed, Pн 6.2–6.4; unlimed, Pн 5.4–5.6. The results show that a greatly increased crop production can be obtained by simply changing the reaction of such soils so as to be favorable to the growth of *Azotobacter.*—*R. W. Webb.*

SOIL SCIENCE

J. J. Skinner, *Editor*

1146. McMurran, S. M. **Pecan rosette in relation to soil deficiencies.** U. S. Dept. Agric. Bull. 756. *11 p., figs. 1–4.* 1919.—The relation of the rosetting of pecans to soil deficiencies is pointed out. On the river flood plain soils of Louisiana, where the soil is deep and black, of high fertility and water holding capacity the disease is almost unknown. Its occurrence is most prevalent on the unproductive, deep sand and sandy clay soils of the Atlantic and Gulf Coastal plains. It is not found on the fertile soils containing large amounts of organic matter of this region. Experiments showed that the liming of soils did not prevent rosetting, nor was there any relation between acid soils and the rosetting of pecans. Stable manure incorporated in the soil prevented the disease to a large extent. The growing of leguminous crops in the orchard for the purpose of green manuring is recommended.—*J. J. Skinner.*

1147. NOYES, H. A., AND S. D. CONNOR. **Nitrates, nitrification and bacterial contents of five typical acid soils as affected by lime, fertilizer, crops and moisture.** Jour. Agric. Res. 16: 27–42. *Pl. 1–9.* 1919.—The paper presents results of investigations taking into consideration both the nitrates and bacterial numbers, as well as a correlation of these two, under certain specific conditions.—The data were secured from fine soil samples which were kept under controlled conditions. The soils were all very acid and varied widely in organic matter. Applications of calcium carbonate, 2 to 4 tons per acre, increased nitrate accumulation and gave higher bacterial counts. Other fertilizers were less regular in their effect.—The soils, when fully saturated with water and incubated with ammonium sulphate, did not accumulate nitrates, when one-fourth and one-half saturated they showed considerable increase in nitrate content. Increased moisture content tended to increase aerobic and anaerobic counts.—Bacterial counts are correlated with nitrate accumulation.—*J. K. Wilson.*

1148. WRIGHT, R. C. **Nitrogen relations of certain crop plants when grown alone and in association.** Jour. Amer. Soc. Agron. 11: 49–66. 1919.—In a study made of the behavior of representative field crops grown alone and in combination with other crops, the non-legumes, barley, rye, oats, and kafir were each grown in the same soil with one of the legumes, vetch, field peas and red clover; corn was also grown with oats and millet. The soil used in the experiments was contained in large galvanized iron buckets holding 45 grams of moist soil. When 2 species of plants were grown in association, half the number of plants of each were used as when grown alone. Crops were grown to maturity and harvested close to the surface of the soil. When account was taken of the nitrogen occurring in the soil and in the plant after harvesting, it was found that there was a distinct loss of nitrogen when barley was grown with peas, rye with peas or clover, and corn with millet. There was a gain in nitrogen when barley was grown with vetch or clover, oats with peas or clover, and kafir with vetch. In general, when barley and vetch or clover, oats and vetch or peas, and kafir and vetch were grown together, although more dry matter and nitrogen were produced, not so much nitrogen was removed from the soil as when these crops were grown alone. Oats and kafir gained in percentage of nitrogen when grown with vetch, peas or clover, and corn lost with both oats and millet. All other crops gained in percentage of nitrogen when grown with some crops and lost with others. Similar experiments were repeated the following season using 3 types of soil from the states of California, Kansas and Virginia. Oats, barley and kafir were used as the non-legumes, and soybeans and purple vetch as the legumes. For each of the combinations there was found to be a gain of nitrogen during the growth of the crop in one or more of the soils and a loss in the others. Oats and kafir when grown with vetch, and soybeans when grown with vetch, and soybeans when grown with oats or barley gained in percentage of nitrogen in all soils; while barley with soybeans, and vetch with barley or kafir lost in all soils.—*W. H. Ross.*

1149. GREAVES, J. E., E. G. CARTER. AND N. C. GOLDTHORPE. **Influence of salts on the nitric-nitrogen accumulation in the soil.** Jour. Agric. Res. 16: 107–135. *5 fig.* 1919.—The toxicity of the chlorides, nitrates, sulphates and carbonates of Na, K, Ca, Mg, Mn, and Fe as determined by nitrification is influenced by the specific salt and not by electro-negative-ion. The quantity of a salt which can be used without decreasing nitrification varies with the salt. The order of decreasing toxicity of the salts on the acid sandy loam used was as follows: Na_2SO_4, Na_2CO_3, $CaCO_3$, K_2SO_4, K_2CO_3, $Fe(NO_3)_2$, $NaNO_3$, $MgSO_4$, $FeSO_4$, $Ca(NO_3)_2$, KNO_3, KCl, $Mg(NO_3)_2$, $Mn(NO_3)_2$, $FeCl_3$, $MgCO_3$, NaCl, $CaCl_2$, and $CaSO_4$. The toxicity of some salts increase more rapidly than others. The principal factor seems to be a physiological one due to the action of the substance on the living protoplasm of the cell. The common soil alkalies, $CaCl_2$, Na_2SO_4, Na_2CO_3, are very toxic to the nitrifying organisms, and when present in sufficient amounts greatly reduce the NO_3 accumulation in the soil. With the exception of Na_2SO_4, Na_2CO_3, $CaCO_3$, K_2SO_4, K_2CO_3 and $Fe(NO_3)_2$, the salts in some concentrations acted as stimulants of the nitrifying organisms. The compounds which are the strongest plant stimulants are the most efficient in increasing the nitric-nitrogen accumulation in the soil.—*J. J. Skinner.*

1150. Ames, J. W., and T. E. Richmond. **Effect of sulfofication and nitrification on rock phosphate.** Soil Science 6: 351–364. 1918.—A study was made in different soils of the acidity produced by the sulfofication and nitrification of composts containing rock phosphate. In the sulfofication experiments, 2 grams of sulphur were added to 500 gram portions of the soil without and with varying amounts of $CaCO_3$ in order to study the effect of the processes in acid soils and in soils supplied with basic material. Oxidation of the sulphur was found to proceed rapidly in an acid soil, approximately 50 per cent being changed to the form of sulfate. $CaCO_3$ added to an acid soil depressed sulfofication, but in sand mixtures the presence of $CaCO_3$ was found to be essential. In the absence of other bases the Ca of rock phosphate did not serve as a base for the sulfofying process to any appreciable extent. When phosphate rock was added to an acid silt loam at the rate of 1900 parts per million, the oxidation of sulphur incorporated with the phosphate in the absence of $CaCO_3$, or nitrogen carriers, changed 630 parts of phosphorus into a form soluble in neutral ammonium citrate solution. In a basic soil, or when $CaCO_3$ was added to the mixture, the acidity resulting from sulfofication was neutralized by the Ca present as carbonate, and the solvent action on the phosphate was therefore much less than occurred in the acid soil. When sulphur and dried blood were added to an acid soil, the oxidation of the sulphur proceeded actively but nitrification in the absence of $CaCO_3$ was practically inhibited by the acidity resulting from the oxidation of the sulphur. The transition from proteid apparently ended with the formation of NH_3 which in turn reacted to neutralize the acidity arising from the sulfofying organisms. Nitrification is stimulated by rock phosphate to a very limited extent. It is not an active agent for increasing the solubility of rock phosphate when mixed with soil.—*W. H. Ross.*

1151. McCool, M. M., and C. E. Millar. **Some general information on lime and its uses and functions in soils.** Michigan Agric. Exp. Sta. Special Bull. 91. *11 p., fig. 1–9.* 1918. The general effect of lime on crops, the sources and the supply in Michigan is discussed. A list of legumes and non-legumes which respond to lime are given.—*J. J. Skinner.*

1152. Noyes, H. A. **The effect of heat on the lime requirements of soils.** Jour. Amer. Soc. Agron. 11: 70–71. 1919.—It is shown from examination of samples of soil collected at different depths and in different places that reactions take place in the soil at the temperature of the steam bath that do not take place when the soil and water mixture is not heated. It is held that the Veitch method which gives the reaction between soil, water and $Ca(OH)_2$ at steam bath temperature does not represent the lime requirement of the soil at ordinary temperatures.—*W. H. Ross.*

1153. Deatrick, E. P. **The effect of manganese compounds on soils and plants.** Cornell Univ. Agric. Exp. Sta. Mem. 19: 371–402. 1919.—See Bot. Absts. 2, Entry 1136.

1154. True, Rodney H., Otis F. Black, and James W. Kelly. **Ash absorption by spinach from concentrated soil solutions.** Jour. Agric. Res. 16: 15–25. 1919.—See Bot. Absts. 2, Entry 1118.

1155. Schollenberger, C. J. **Organic phosphorus of soil: experimental work on methods for extraction and determination.** Soil Science 6: 365–395. 1918.—Detailed descriptions of several methods used in the study of the organic phosphorus of the soil is given. It is shown that as solvents for the organic phosphorus of the soil studied, solutions of the hydroxides of the fixed alkalies are not superior to NH_3. One extraction by NH_3 when carried out under the proper conditions was found to remove practically all the organic phosphorus from the soil that is capable of being taken into solution by NH_3. No consistent relations were observed in these solutions between the contents of NH_3 soluble organic matter (humus), humus ash, SiO_2, Fe_2O_3 and Al_2O_3; nor between the total organic matter and the organic phosphorus in NH_3-extracts prepared in various ways, although there was a general tendency for these to vary together. The most satisfactory method for separating clay from ammoniacal soil extracts, having in view the maximum content of organic phosphorus, was found to consist

in filtering the extract through a layer of the soil itself supported by a flat paper filter on a Buchner funnel as described by MacIntire and Hardy (C. A. 9, 346). Evidence is presented that inorganic phosphorus absorbed by colloids, organic or inorganic, is not included in the apparent content of organic phosphorus as determined by the methods used. Determinations of humus, color and organic phosphorus in NH_3-extracts of 4 depths of the soil indicate that these NH_3-soluble constituents are present in about the same relative proportions in the 4 depths examined. The total nitrogen content of the same 4 depths of soil stand in ratios very similar to those exhibited by the NH_3-soluble constituents named.—*W. H. Ross.*

1156. HOPKINS, C. G., J. G. MOSIER, E. VAN ALSTINE, AND F. W. GARRETT. **Champaign County soils.** Illinois Agric. Exp. Sta. Soil Rept. 18. *61 pp., plate 1-14, 4 maps.* 1918.—A soil survey map of the county is given together with the results of chemical analyses and fertilizer experiments on the principal soil types. The soils are divided into 4 groups (a) upland prairie, (b) upland timber, (c) terrace, and (d) swamp and bottom land soils. The upland prairie soil comprise 92.2 per cent of the entire area. Upland timber soils 4.9 per cent, terrace soils 0.52 per cent and swamp soils 2.3 per cent. The upland prairie soils are higher in organic matter, and plant food elements than other soil classes except the swamp soils, which contain more organic matter. Field experiments show the soils to respond well to phosphorus when applied with nitrogen or with legumes. Manure, limestone and phosphorus produced large increased clover growth on the brown silt loam prairie soils.—*J. J. Skinner.*

1157. CLOUSTON, D. **Manures in their relation to soils and crop production in the central provinces.** Agric. Jour. India. 14: 101–6. 1919.—The 4 principal soils of the central provinces are described, i.e., the alluvial soils of the Nerbudda Valley, or wheat soils; the black cotton soils, and the lateritic and motamorphic rice soils. All of the soils are low in fertility and respond well to stock manure.—*J. J. Skinner.*

1158. DAVIS, W. **Present position and future prospects of the natural indigo industry. IV. The effect of superphosphate manuring on the yield and quality of the indigo plant.** Agric. Jour. India. 14: 21–41. 1919.—It is pointed out that the indigo industry in India is critical due to the impoverishment of the soil. Experiments conducted show that the soil is restored for indigo culture by use of phosphates. This fertilization also prevents the wilt. Stable manure and lime did not cause an increased production. The yield of indigo cake per plant is also increased by phosphate. Phosphate fertilization is concluded to be the best treatment for restoring soil for indigo culture.—*J. J. Skinner.*

1159. DANIEL, LUCIEN. **Cultures maraichères expérimentales au bord de la mer. [Market gardening experiments on the sea coast.]** Compt. Rend. Acad. Sci. Paris 168: 116–118. 1919.—See Bot. Absts. 3, Entry 80.

1160. LAPICQUE, L., AND E. BARBÉ. **Indice de chlore comme mesure comparative de la richesse des terres en humus. [Chlorine index as a measure of the comparative amount of humus in soils.]** Compt. Rend. Acad. Sci. Paris 168: 118–121. 1919.—A simple method is suggested by which indications of the amount of humus in soils may be obtained. It is believed that this method will be especially useful in studying the soils of devastated regions.—*V. H. Young.*

1161. BERTHELOT, DANIEL, AND RENÉ TRANNOY. **Sur le pouvoir absorbant de la terre sèche ou humide vis-à-vis du chlore gazeux. [Concerning the absorbing power of soils in contact with chlorine gas.]** Compt. Rend. Acad. Sci. Paris 168: 121–123. 1919.—The chlorine absorbing power of different types of soil with varying amounts of moisture is determined.—*V. H. Young.*

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BOTANICAL ABSTRACTS

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

1162. RICHARDSON, A. E. V. **Agriculture. America and Australia compared.** Jour. Dept. Agric. Victoria 17: 1-20. 1919.—See Bot. Absts. 3, Entry 162.

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

1163. ANONYMOUS. **The forestry situation in New South Wales.** Amer. Forestry 25: 862-863. 1919.

1164. ANONYMOUS. **Note on Corypha palm in North Kanara.** Indian Forester 44: 509-510. Nov., 1918.—The character of the forests in which the corypha palm (sp?) is described, with the character of its reproduction power and longevity. The pith found in mature trees is of great value for flour. Leaves are used for umbrellas and the seeds for ornaments.—*E. N. Munns.*

1165. ANONYMOUS. **Manitoba 75 per cent under forest.** Canadian Forestry Jour. 14: 13-15. Jan., 1919.—About 75 per cent of Manitoba is forested, the forests extending northward till the "barren lands" are reached. White spruce is the only species of much value, growing to 36 inches in diameter and 90 feet in height. Fire has caused much damage and many regions have not reforested. The annual cut is around 15 million board feet. Pulpwood offers great possibilities and peat may be secured. The possibility of securing a steady revenue from the forest is discussed together with Sweden's example in forest practices under similar climatic conditions.—*E. N. Munns.*

1166. BESLEY, F. W. **Forest opportunity on pine lands in the South.** Amer. Forestry 25: 983-984. 1919.

1167. BLANFORD, H. R. **Note on operations in bamboo flowered areas.** Indian Forester 44: 550-559. 1918.—Observations show that during the flowering of bamboo, teak can get well established and make good growth before being suppressed. Artificial regeneration at the time is also easy.—*E. N. Munns.*

1168. CHAPMAN, HERMAN H. **Forests and floods in China.** Amer. Forestry 25: 835-843. *21 fig.* 1919.—The influence of forests upon stream flow is considered with special reference to conditions in China. The disastrous Chihli flood of 1917 caused great loss of life, made

thousands of people homeless, destroyed houses and crops and greatly interfered with railway operation. The only practicable method of checking the floods is by reforestation of the denuded slopes. Without reforestation, the plains of China will continually be subject to floods of greater and greater severity. The need of China today is the creation of a national policy for reforesting the mountain slopes of northern China.—*Chas. H. Otis.*

1169. Clapp, Earle H. **Forest research—in the war and after.** Amer. Forestry 25: 947–950. *3 fig.* 1919.

1170. De, R. N. **Simul plantation in Jkums in Assam.** Indian Forester 44: 516–520. Nov., 1918.—The management of simul (*Bombax malabaricum*) is described. The tree requires 25 to 30 years to attain a 6 foot circumference, which is the best size for use in making tea boxes and for cold storage chests.—*E. N. Munns.*

1171. Fernow, B. E. **Why should a tree die?** Canadian Forestry Jour. 14: 1–11. Jan., 1919.—The dragon trees, a genus of the lily family, on the Teneriffe Island, many thousands years old, are 15 feet in diameter and 75 feet in height. The more rapid-growing Sequoias are much larger but only attain an age of 3,000 to 4,000 years at the most.—*E. N. Munns.*

1172. Fischer, C. E. C. **Cause of the spike disease of sandal.** Indian Forester 44: 570–575. 1918.—Observations on the disease are given, in connection with entomological work as a source of distribution of the disease.—*E. N. Munns.*

1173. Gaskill, Alfred. **Why wood is best.** Amer. Forestry 25: 991–994. *7 fig.* 1919.—*Popular.*

1174. Gibson, A. J. **The rosin and turpentine factory at Jallo, Punjab.** Indian Forester 44: 539–550. 1918.—A description of the operation and methods employed in a new still operated by the Forest Department is given.—*E. N. Munns.*

1175. Hole, R. S. **Notes from Dehra Dun Herbarium. Some Indian species of Zizyphus.** Indian Forester 44: 504–508. Nov., 1918.—A continuation of previous work. General descriptions and characteristics of the species of the genus are given, with notes and comments. —*E. N. Munns.*

1176. Howard, S. **Sal nurseries in Gorakhpur.** Indian Forester 44: 560–570. 1918.—Observations are given on three sal nurseries. It was found that the seedlings cannot stand transplanting unless with a ball of earth; working the soil is essential, no shade is needed for the young trees, and root and shoot cuttings are detrimental to the plant.—*E. N. Munns.*

1177. Lushington, P. M. **Progress of spike investigation.** Indian Forester 44: 439–460. Oct., 1918.—Results of the spike investigations in India appear to show that spike is a disease caused by microorganisms, infection being possible through animals, birds, insects and plants. The disease spreads more rapidly in seedlings that in trees, the spring months being most favorable. Incubation is uncertain and preventative measures so far have failed to stop the trouble. [See Bot. Absts. 2, Entries 1296, 1297, 1298, 1303, 1304, and 1307.]—*E. N. Munns.*

1178. Marsden, Edward. **Girth-increment of sal in regular crops in the United Provinces.** Indian Forester 44: 469–475. Oct., 1918.—The girth-increment of sal based on both total girth and on age is given and plotted on charts for different quality sites.—E. *N. Munns.*

1179. Maxwell, Hu. **The uses of wood. Wooden artificial limbs.** Amer. Forestry 25: 807–816. *16 fig.* 1919.

1180. MAXWELL, HU. **The uses of wood. Wood used in vehicle manufacture.** Amer. Forestry 25: 845–852. *14 fig.* 1919.

1181. MAXWELL, HU. **The uses of wood. Fencing materials from forests.** Amer. Forestry 25: 923–930. *18 fig.* 1919.

1182. MAXWELL, HU. **The uses of wood. Wooden boats and their manufacture.** Amer. Forestry 25: 973–983. *19 fig.* 1919.

1183. MELROSE, GEORGE P. **Coupling the forest to the fruit farm.** Canadian forestry Jour. 14: 8–11. Jan., 1919.—Irrigation interests of the Okanagan Valley require a steady water supply during the growing season, which is supplied by the forested mountains. General considerations of the effect of forests upon run-off and erosion are described.—*E. N. Munns.*

1184. NICHOLSON, J. W. **Mesopotamia and afforestation.** Indian Forester 44: 476–485. Oct., 1918.—It is problematic that the Mesopotamian country ever supported much forest, but the irrigation which is to be developed under British aid will call for a greater population and need for fuel and small sizes of timber. This can probably be grown to some extent in the irrigated lands, but it is doubtful if, with the small rainfall, it will be possible without the aid of additional water. It is possible that the higher country receives enough rainfall to make a growth of some kind of material possible. At best, the forest would be open and composed more or less of xerophytic species.—*E. N. Munns.*

1185. OSMASTON, A. E. **Note on some chir seed eaters.** Indian Forester 44: 462–467. Oct., 1918.—Chir pine (*P. longifolia*) produces large quantities of edible seed which are destroyed by many agencies, though there is abundant reproduction. Man, monkies, flying-squirrels, wood-pigeons, nut-crackers, woodpeckers, and grosbeaks are the agencies responsible for this destruction, and each of these is discussed.—*E. N. Munns.*

1186. PEARSON, C. H. **Uses of the Brazil-nut tree.** Amer. Forestry 25: 782–784. *5 fig.* 1919.—A popular description of *Bertholletia excelsa*, including tree characters, distribution, the wood and its uses, the native method of gathering the seeds, value of seeds exported and use of inner bark for making oakum.—*Chas. H. Otis.*

1187. PEARSON, R. S. **Preliminary note on the seasoning of some Indian timbers by natural methods.** Indian Forest Rec. 7^1: 1–73. *1 pl.* 1919.—Tests were made in 6 provinces to determine the best treatment to be accorded both logs and timber. No one method was found to be suitable for every wood, and the result of the work is given for 33 woods in descriptive detail and in tables.—*E. N. Munns.*

1188. RAITT, WM. **Note on the prospects of manufacturing paper-pulp from Himalayan soft-woods.** Indian Forester 44: 510–512. Nov., 1918.—At the date of writing the value of spruce and fir (sp?) wood has become greater in construction and manufacturing work than for paper-making, reducing the amount of pulp manufactured. Saw-mill waste is generally difficult to handle for pulp, but under present conditions it may become profitable. Figures are given on costs of installation of plants and possible profits.—*E. N. Munns.*

1189. RIDSDALE, P. S. **French forests for our army.** Amer. Forestry 25: 963–972. *14 fig.* 1919.

1190. SWAINE, J. M. **Canadian bark beetles.** *4 parts. 31 pl., 262 fig.* Dominion Dept. Agric., Entomological Branch, Forest Insect Division: Ottowa, 1918.—Part 1, "Descriptions of new species," describes 40 new species of Canada and northern United States. Part 2 gives "A preliminary classification with an account of the habits and methods of control."

Part 3 gives a short account of the structural characters of bark beetles. Part 4 presents an arrangement of Canadian bark beetles with keys for their determination. [Through abst. in: Canadian Forest Jour. 14: 12. Jan., 1919.]—*E. N. Munns.*

1191. Tillotson, C. R. **The possibilities of farm woodland development under the Smith-Lever Act.** Amer. Forestry 25: 785–787. *4 fig.* 1919.

1192. Trevor, C. G. **A new system of timber exploitation.** Indian Forester 44: 525–527. Nov., 1918.—The yield of deodar, *Cedrus deodara*, is given by diameters and quality, three sites being recognized, for the Kulu Division. Volumes are given in cubic feet and in scantlings.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

1193. Adami, I. G. **Medical contributions to the study of evolution.** *xviii + 372 p.* London, 1918.—See also Bot. Absts. 2, Entry 1226; 3, Entry 585.

1194. Allard, H. A. **Gigantism in Nicotiana tabacum and its alternative inheritance.** Amer. Nat. 53: 218–233. May–June, 1919.—See Bot. Absts. 3, Entry 216.

1195. Allard, H. A. **The Mendelian behavior of aurea character in a cross between two varieties of Nicotiana rustica.** Amer. Nat. 53: 234–238. May–June, 1919.—See Bot. Absts. 3, Entry 217.

1196. Bartlett, J. Gardner. **The increase, diffusion, and decline of the Mayflower and other New England stock.** Jour. Heredity 10: 141–142. Mar., 1919.

1197. Baur, E. **Über eine eigentümliche mit absoluter Koppelung zusammenhängende Dominanzstörung.** [**On a characteristic disturbance of dominance correlated with complete linkage.**] Ber. Deutsch. Bot. Ges. 36: 107–111. 1918.

1198. Baur, Erwin. **Mutationen von Antirrhinum majus.** [**Mutations of Antirrhinum majus.**] Zeitschr. indukt. Abstamm. Vererb. 19: 177–193. *10 fig.* June, 1918.—Preliminary paper summarizing in general fashion studies of a series of mutants of *Antirrhinum majus.* Apart from certain mutants in this species, involving chromatophore characters exhibiting non-Mendelian inheritance, all the mutants found appear to differ from their parent races in only one Mendelian factor. These latter number 20, and nearly all are "loss mutations" and recessives. Some have occurred several times, but most of them have been found but once. Three distinct modes of occurrence are described: 1. In the sexual descendants of one individual, the mutant may occur as a heterozygote (heterozygous mutant from seed). 2. In the sexual descendants of one individual, the mutant may arise as a homozygote (homozygous mutant from seed). 3. In a single plant, vegetative tissue areas or entire shoots may arise as heterozygous mutants.—Several examples of each mutant class are described in detail, together with figures illustrating their ancestry through several generations. In addition to the three classes above mentioned, a fourth may be assumed to occur (homozygous mutation from a single vegetative cell). Baur has never found this type in his cultures, and investigation of the literature has discovered only one case.—During the past 14 years, over 200,000 plants of *A. majus* have been studied and data on the relative frequency of the various classes or modes of mutation have been kept. Mutations under mode 1 approximate a frequency of 20 per cent.; under mode 2, a frequency of 0.05 per cent., the former occurring 40 times as often as the latter. Mutations of mode 3 type were observed in five cases, but owing to difficulties in detecting them, involving the character of the factorial composition of the material, many more cases no doubt occurred. Hence, this type or mode is assumed

to have the highest frequency, while types involving mode 4 are the rarest, if they occur at all in this species.—In *Antirrhinum* both varietal and specific genetic differences have been investigated, especially as regards the form, size, and color of the flowers. With but few exceptions all character differences studied Mendelize. Thirty factors in the floral organs alone of *A. majus* have been isolated. Owing chiefly to the much larger number of chromosomes in Antirrhinum (at least 15 pairs), the relative frequency of observed factor linkage is much less than in organisms such as *Hordeum* and *Drosophila* with comparatively few chromosomes. Only two linkage groups have so far been observed, each of which consists of 3 factors in which linkage or coupling is absolute. Both these groups are assumed to be localized in different chromomeres. Baur suggests that in certain chromosomes and chromomeres, mutations may take place more easily than in others.—*Orland E. White.*

1199. BECKING, BAAS. [Rev. of: KAPTEYN, J. C. **Skew frequency curves in biology and statistics.** Rec. Trav. Bot. Néerland. 13: 105–157. 1916.] Genetica 1: 183–187. Mar., 1919.

1200. BECKING, BAAS. [Rev. of: JENNINGS, H. S. **Heredity, variation and the results of selection in the uniparental reproduction of Difflugia corona.** Genetics 1: 407–534. 1916.] Genetica 1: 179–182. Mar., 1919.

1201. BECKING, BAAS. [Rev. of 2 papers: (1) HARRIS, F. S., AND J. C. HOGENSON. **Some correlations in sugar beets.** Genetics 1: 334–347. 1916. (2) PRITCHARD, F. J. **Correlations between morphological characters and the saccharine content of sugar beets.** Amer. Jour. Bot. 3: 361–376. *8 fig.* 1916.] Genetics 1: 170–172. Mar., 1919.

1202. BERNARD, N. **L'evolution des plantes.** [The evolution of plants.] *314 p., 29 fig.* Felix Alcan: Paris, 1918. See also Bot. Absts., 2, Entry 1244.

1203. BLAKESLEE, ALBERT F., AND B. T. AVERY, JR. **Mutations in the jimson weed.** Jour. Heredity 10: 111–120. *Fig. 5–15.* Mar., 1919.

1204. BRIDGES, CALVIN B. **The genetics of purple eye color in Drosophila.** Jour. Exp. Zool. 28: 255–305. May 20, 1919.—See Bot. Absts. 3, Entry 601.

1205. DAWSON, ANDREW IGNATIUS. **Bacterial variations induced by changes in the composition of culture media.** Jour. Bac. 4: 133–148. Mar., 1919.

1206. DECOUX, A. **Breeding of Crimson-eared Waxbill × Cordon Bleu hybrids.** Avic. Mag. 10: 102–103. Apr., 1919.—Several broods of hybrids were obtained from a female Cordon Bleu mated with a male Violet-eared Waxbill, but in no case were the hybrids brought to maturity, mostly on account of neglect by the parent birds.—*R. E. Clausen.*

1207. DECOUX, A. **Breeding of Melba Finch × Crimson-eared Waxbill hybrids.** Avic. Mag. 10: 110–111. Apr., 1919.—Three broods of hybrids were obtained from a Crimson-eared Waxbill hen mated to a Melba Finch cock. Hybrid fledglings resembled young Crimson-eared Waxbills, but were larger and showed distinct evidences of hybrid origin. A full description of adult hybrids is given. In shape they resembled Crimson-eared Waxbill, but in size and in song they were like the male parent.—*R. E. Clausen.*

1208. DELAGE, YVES. **Suggestion sur la nature et les causes de l'hérédité ségrégative (caractères mendéliens) et de l'hérédité agrégative (caractères non-mendéliens).** [Suggestion as to the nature and the causes of segregative heredity (Mendelian characters) and of aggregative heredity (non-Mendelian characters).] Compt. Rend. Acad. Sci. Paris. 168: 30–36. 1919.—Author rejects current explanation of heredity involving individuality of chromosomes and reduction division in maturation. Theory has required "tottering scaf-

folding" of accessory hypotheses "destined to fall in ruins." In its place author suggests following two propositions: First, sperm may in some cases initiate development of egg, but its chromatin not participate in that development (Baltzer on echinoderm crosses). Second, when chromatin of both parents is functional, maternal and paternal contributions may be relatively heterogeneous or homogeneous. If heterogeneous, microsomes (perhaps) of chromosomes do not fuse, later separate and bring about segregative (Mendelian) heredity. If homogeneous, microsomes may fuse completely, never separating into original components, accounting for aggregative (non-Mendelian, blending) inheritance. Variety of conditions may exist between these extremes. Qualitative characters probably depend upon heterogeneous chromatin, quantitative characters on homogeneous chromatin. Same chromosome may present different degrees of heterogeneity in different parts, so that certain characters are aggregative, others segregative. Different individuals of same race may show different degrees of heterogeneity.—*A. Franklin Shull.*

1209. Derschau, M. von. **Über disperme Befruchtung der Antipoden bei Nigella arvensis. [On double fertilization of the antipodals in Nigella arvensis.]** Ber. Deutsch. Bot. Ges. **36**: 260–263. 1918.

1210. De Vries, H. **Phylogenetische und gruppenweise Artbildung. [Phylogenetic and group-wise formation of species.]** Flora 11, 12 (Festschr. Stahl.): 208–226. 1918.

1211. De Vries, H. **Halbmutanten und Massenmutationen. [Half mutants and mass mutations.]** Ber. Deutsch. Bot. Ges. **36**: 193–199. 1918.

1212. Dresel, K. **Inwiefern gelten die Mendelschen Vererbungsgesetze in der menschlichen Pathologie? [To what extent do Mendelian laws of heredity hold in human pathology?]** Virchow's Arch. **224**. *256 p.* 19—.

1213. Ernst, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich; eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. [Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.]** *8vo, xv + 665 p., 172 fig.* Gustav Fischer: Jena, 1918.—See also Bot. Absts. 2, Entry 1234.

1214. Freeman, Geo. F. **Heredity of quantitative characters in wheat.** Genetics **4**: 1–93. Jan., 1919.—See Bot. Absts. 3, Entry 629.

1215. Frets, G. P. **Erfelijkheid en eugeniek. [Heredity and eugenics.]** Social Gids. **3**: 23–38, 155–173. 1918.

1216. Fruwirth, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. II. Die Züchtung von Mais, Futterrüben und anderen Rüben, Oelpflanzen und Gräsern. [Handbook of agricultural plant breeding. II. The breeding of maize, fodder beets, and other roots, oil plants and grasses.]** *3rd ed., 262 p., 50 fig.* P. Parey: Berlin, 1918.—See also Bot. Absts. 2, Entry 1245.

1217. Goebel, K. **Zur Kenntnis der Zwergfarne. [To a knowledge of the dwarf ferns.]** Flora 11, 12 (Festschr. Stahl): 268–281. 1918.

1218. Goedewaagen, M. A. J. [Rev. of: Freeman, G. F. **Linked quantitative characters in wheat crosses.** Amer. Nat. **51**: 683–689. 1917.] Genetica **1**: 161–162. Mar., 1919.

1219. Goedewaagen, M. A. J. [Rev. of: Lotsy, J. P. **Antirrhinum rhinanthoides mihi, une nouvelle espèce Linnéenne, obtenue experimentalement. (Antirrhinum rhinanthoides mihi, a new Linnean species, derived experimentally.)** Arch. Néerland. Sci. **3**: 195–204. 1916.] Genetica **1**: 188–190. Mar., 1919.

1220. GOEDEWAAGEN, M. A. J. [Rev. of: JONES, D. F. **Linkage in Lycopersicum.** Amer. Nat. 51: 608–621. 1917.] Genetica 1: 182–183. Mar., 1919.

1221. JONES, D. F., AND C. A. GALLASTEGUI. **Some factor relations in maize with reference to linkage.** Amer. Nat. 53: 239–246. May–June. 1919.

1222. KATTUR, G. L. **An improved type of cotton for the southern Maratha Country.** Agric. Jour. India 14: 165–167. *Pl. 1.* 1919.—See Bot. Absts. 3, Entry 170.

1223. KEY, WILHELMINE E. **Better American families. II.** Jour. Heredity 10: 80–83. Feb., 1919.

1224. KEY, WILHELMINE E. **Better American families. III.** Jour. Heredity 10: 107–110. Mar., 1919.

1225. KIRKHAM, WILLIAM B. **The fate of homozygous yellow mice.** Jour. Exp. Zool. 28: 125–135. *2 fig.* May 20, 1919.—See Bot. Absts. 3, Entry 264.

1226. KOHLBRUGGE, J. H. F. [Rev. of: ADAMI, I. G. **Medical contributions to the study of evolution.** *xviii + 372 p.* London, 1918.] Genetica 1: 149–152. Mar., 1919.

1227. KOHLBRUGGE, J. H. F. [Rev. of: LUSCHAN, F. VON. **Kriegsgefangene. [Prisoners of war.]** *117 p.* Reimer: Berlin, 1917.] Genetica 1: 190–192. Mar., 1919.

1228. KOOIMAN, H. N. **Overzicht over enkele Oenothera problemen. [Review of a few Oenothera problems.]** Genetica 1: 134–148. Mar., 1919.

1229. KOOIMAN, H. N. [Rev. of: GATES, R. R. **Vegetative segregation in a hybrid race.** Jour. Genetics 6: 237–253. 1917.] Genetica 1: 163–164. Mar., 1919.

1230. KOOIMAN, H. N. [Rev. of: IKENO, S. **Studies on the hybrids of Capsicum annuum. II. On some variegated races.** Jour. Genetics 6: 201–229. *1 pl., 2 fig.* Apr., 1917.] Genetica 1: 176–177. Mar., 1919.

1231. KOOIMAN, H. N. [Rev. of: HERIBERT-NILSSON, N. **Eine mendelsche Erklärung der Verlustmutanten. [A Mendelian explanation of loss mutants.]** Ber. Deutsch. Bot. Ges. 34: 870–880. 1917.] Genetica 1: 202–203. Mar., 1919.

1232. KOOIMAN, H. N. [Rev. of: KLEBS, G. **Ueber erbliche Blütenanomalien beim Tabak. [Concerning hereditary floral anomalies in tobacco.]** Zeitschr. indukt. Abstamm. Vererb. 17: 53–117. 1916.] Genetica 1: 187–188. Mar., 1919.

1233. KOOIMAN, H. N. [Rev. of: PUNNETT, R. C. **Reduplication series in sweet peas. II.** Jour. Genetics 6: 185–193. 1917.] Genetica 1: 206–207. Mar., 1919.

1234. LOTSY, J. P. [Rev. of: ERNST, A. **Bastardierung als Ursache der Apogamie im Pflanzenreich; eine Hypothese zur experimentellen Vererbungs- und Abstammungslehre. [Hybridization as the cause of apogamy in the plant kingdom; an hypothesis for experimental evolution and genetics.]** *665 p., 172 fig.* Gustav Fischer: Jena, 1918.] Genetica 1:158–161. Mar., 1919.

1235. LOTSY, J. P. [Rev. of: JAEGER, F. M. **Lectures on the principle of symmetry and its application in all natural sciences.** *333 p., 170 fig.* Elsevier: Amsterdam, 1917.] Genetica 1: 177–179. Mar., 1919.

1236. Pascher, A. **Über die Beziehung der Reduktionsteilung zur Mendelschen Spaltung. [On the relation of the reduction division to Mendelian segregation.]** Ber. Deutsch. Bot. Ges. 36: 163–168. 1918.

1237. Pearl, Raymond. **The seasonal distribution of swine breeding.** Sci. Monthly 19: 244–251. Sept., 1918.—Registry records in 1913–14 of pure-bred swine breeds, Poland China and Duroc Jersey, were used to determine random date of birth by litters in four zones in U. S. Amer., northern, southern, north central, and south central. Frequency populations in month classes were then arranged based on 500 records for each breed in each zone. Average of all records show multimodal curve for date of birth with modes on March and September. Out of a total of 4000 records, 2096 were born in March and April and 477 in September and October.—*H. K. Hayes.*

1238. Péterfi, M. **Über Bastarde der Pulmonaria rubra Schott et Ky. [On hybrids of Pulmonaria rubra Schott and Ky.]** Bot. Museumshefte [Bot. Múzeumi Füzetek.] ( ) 1916 2: 35–41. 1918.

1239. Pomeroy, Carl S. **Bud variations in sugar cane.** Jour. Heredity 10: 129–135. *Fig. 16–17.* Mar., 1919.

1240. Preiser, Samuel A., and Charles B. Davenport. **Multiple neurofibromatosis (von Recklinghausen's disease) and its inheritance with description of a case.** Eugenics Rec. Office Bull. 19: 1–34. *36 fig.* Oct., 1918.—See Bot. Absts. 3, Entry 281.

1241. Punnett, R. C. **Note on the origin of a mutation in the sweet pea.** Jour. Genetics 8: 27–31. *1 fig.* Dec., 1918.—Details history of origin of "cretin" mutant in the sweet pea. Describes chief characteristics of the mutant form and its genetic behavior. Mutant is recessive and appeared as a single plant in the F_4 generation from a cross of two white-flowered varieties. Differs from parent in a single factor and is believed to have resulted from "some radical alteration in the zygote after union between two normal gametes had already taken place,"—in other words, after fertilization.—*Orland E. White.*

1242. Pusch, G. **Inbreeding live stock.** Jour. Heredity 10: 88–89. Feb., 1919.

1243. Rabaud, Étienne. **Évolution et sexualité. [Evolution and sexuality.]** Scientia 25: 275–287. 1919.—See Bot. Absts. 3, Entry 660.

1244. Sirks, M. J. [Rev. of: Bernard, N. **l'Évolution des plantes. [The evolution of plants.** *314 p., 29 fig.* Felix Alcan: Paris, 1918.] Genetica 1: 153–156. Mar., 1919.

1245. Sirks, M. J. [Rev. of: Fruwirth, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. II. Die Züchtung von Mais, Futterrüben und anderen Rüben, Oelpflanzen und Gräsern. [Handbook of agricultural plant breeding. II. The breeding of maize, fodder beets, and other roots, oil plants and grass.** *3rd ed., 262* p., *50 fig.* P. Parey: Berlin, 1918.] Genetica 1: 162–163. Mar., 1919.

1246. Sirks, M. J. [Rev. of: Heribert-Nilsson, N. **Naturens ändamalsenlighet och olika artbildningsteoriers ställning till denna fragen. (Doelmatigheid in de natur en het standpunt der verschilldende theorieën over het ontstaan der soorten ten opzichte van dit vraagstuk.)** *48 p.* A. Bonnier: Stockholm, 1917.] Genetica 1: 203–205. Mar., 1919.

1247. Stakman, E. C., M. N. Levine, and J. G. Leach. **New biologic forms of Puccinia graminis.** Jour. Agric. Res. 16: 103–105. Jan. 20, 1919.—See Bot. Absts. 2, Entry 1082.

1248. STARK, MARY B. **An hereditary tumor in the fruit fly Drosophila.** Jour. Cancer Res. 3: 279–301. *1 pl., 2 fig.* July, 1918.—Lethal factor "7" in Drosophila is sex-linked in inheritance and kills 50 per cent of the males in stocks possessing it. The somatic manifestation of this factor in such animals is one or more black spots appearing in the larvae. Sections of these spots show them to be due to cellular growths somewhat resembling tumors of the higher vertebrates and having pigment both inside of and outside the cells. All larvae having tumors die between the second day and pupation. The tumors have little pigment in their early stages but become increasingly darker with age. No correlation exists between size of larva and size of tumor. Tumors may occur in any segment of body, most frequently in segments 6 and 12. Tumors were removed by operation under ether and about 5 per cent. of the operated larvae lived. None of these pupated. A control series of normal larvae gave 5 per cent. survival after operation and successful pupation in all of these. A toxic effect is exerted upon larvae injected with suspension of ground tumor cells in Locke's solution. A series of experiments with X-rays showed no visible effect upon the tumors.—*C. C. Little.*

1249. STARK, MARY B. **An hereditary tumor.** Jour. Exp. Zoöl. 27: 509–529. *3 pl.* Feb., 1919.—Tumor cells multiply in sterile drops of Locke's solution. Implants of living tumor into adult flies produce growths in rare cases. In these cases, death eventually results from toxic action of the tumor. Growth of tumor occurred in 2 out of 40 meal-worm larvae inoculated under absolutely aseptic conditions with bits of the tumor. Carefully controlled series of sterile cultures of egg preparations show tumor not due to infection. Excessive pigmentation of tumor is probable due to imperfect metabolism. Fifteen tumors have been observed in a single larva. Some of these may be metastases. Pieces broken from the tumor artificially inside the body, show growth. Irregularities of mitotic figures have been noted in rapidly growing tumors. All tumors have developed in embryonic rudiments destined during pupation to form adult organs.—*C. C. Little.*

1250. STARK, P. [Rev. of: LEHMANN, ERNST. **Variabilität und Blütenmorphologie. [Variability and floral morphology.]** Biol. Zentralbl. 38: 1–38. Jan., 1918.] Zeitschr. Bot. 10: 552–553. 1918.

1251. STOUT, A. B. Bud variation. Proc. Nation. Acad. Sci. 5: 130–134. Apr., 1919.—See Bot. Absts. 3, Entry 292.

1252. STOUT, A. B., AND HELENE M. BOAS. **Statistical studies of flower number per head in Cichorium intybus: kinds of variability, heredity, and effects of selection.** Mem. Torrey Bot. Club 17: 334–458. June 10, 1918.

1253. TISCHLER, G. **Untersuchungen über den anatomischen Bau der Staub- und Fruchtblätter bei Lythrum Salicaria, mit Beziehung auf das Illegitimitätsproblem. [Studies of the anatomical structure of the stamens and carpels in Lythrum Salicaria, with reference to the problem of illegitimacy.]** Flora 11, 12 (Festschrift Stahl): 162–192. 1918.

1254. TISCHLER, G. **Das Heterostylie-Problem. [The problem of heterostyly.]** Biol. Zentralbl. 38: 461–479. Nov., 1918.

1255. WEATHERWAX, PAUL. **The morphological basis of some experimental work with maize.** Amer. Nat. 53: 269–272. May–June, 1919.—See Bot. Absts. 3, Entry 303.

1256. WESTRIENEN, A. v. [Rev. of: STIEVE, H. **Ueber Ectrodactylie. [On ectrodactyly.]** Zeitschr. Morph. u. Anthrop. 20: 1917.] Genetica 1: 207–208. Mar., 1919.

1257. WHITE, E. A. **Methods of rose-breeding.** Amer. Rose Ann. 1918: 51–55. *7 fig.* 1918.—See Bot. Absts. 3, Entry 304.

1258. Whiting, P. W. **Two striking color variations in the green frog.** Jour. Heredity, 10: 127–128. Mar., 1919.

1259. Wicks, W. H. **The effect of cross-pollination in size, color, shape and quality of the apple.** Monthly Bull. State Comm. Hortic. California 7: 568–573. Oct., 1918.

HORTICULTURE

J. H. Gourley, *Editor*

GENERAL

1260. Barnes, Will C. **Pruning for profit. Are you raising fruit or wood?** Amer. Forestry 25: 798–800. *2 fig.* 1919.—About orange groves; popular.—*Chas. H. Otis.*

1261. Bean, W. J. **Deutzia compacta.** Curtis Bot. Mag. 15: *Pl. 8795* (*colored*). 1919.

1262. Beckwith, Charles S. **Report on cranberry investigations for the season of 1918.** Proc. Ann. Meet. 49: 3–15. Amer. Cranberry Growers' Assoc. *Pl. 1–6.* 1919.—This is a report of work carried on at the New Jersey Cranberry Substation. Nitrogen from nitrate of soda gave immediate and large increase of yield when applied on Savannah bottoms over a period of six years. Nitrogen from dried blood and cotton seed meal gave slower increases, while ammonium sulfate was unsatisfactory. Phosphoric acid from acid phosphate and phosphate rock gave good increases while that derived from basic slag and steamed bone gave only small increases. Potash from muriate and kainit gave poor results, while that from sulfate of potash gave only a low increase.—On mud bottoms nitrogen from all sources gave poor results. Phosphoric acid from acid phosphate, phosphate rock and steamed bone gave fair to good results, while that from basic slag was unsatisfactory. Results from potash from all sources were poor or doubtful.—On iron ore bottoms nitrogen gave poor and in some cases disastrous results, while phosphoric acid from phosphate rock gave somewhat more favorable results.—Tests of mixed fertilizers indicate that certain forms are beneficial on Savannah bottoms while on mud and iron ore bottoms, results were inconclusive.—It was found that sodium cyanide dissolved in water was fairly effective in killing the girdle worm [Crambus hortuellus, Hbn (?)].—*J. K. Shaw.*

1263. Buswell, W. M. **The roselle.** Amer. Bot. 25: 14. *1 fig.* 1919.—The roselle (*Hibiscus sabdariffa*) reported as being sold under the name of Florida cranberries.—*W.N. Clute.*

1264. Coit, J. Eliot, and Robert W. Hodgson. **An investigation of the abnormal shedding of young fruits of the Washington navel orange.** Univ. California Publ. Agric. Sci. 3: 283–368. *Pl. 25–42, fig. 1–9.* 1919.—Experiments conducted near Bakersfield, California, to determine the cause of the summer drop of immature fruits of the navel orange. The district is semiarid and trees are artificially irrigated with water from wells. The trees annually suffer a heavy loss of small immature fruits.—Abscission of larger fruits is believed to be due to infection with *Alternaria citri*, E. and P., which enters through the scars left by the fall of the pistils. The hypothesis is advanced that excessive transpiration from the leaves causes water, together with the enzymatic solutions secreted by the fungus in the "navel end" of the orange to be drawn back through the vascular system of the young fruits through the pedicel and to afford the stimulus to abscission. The fungus is reported to cause a black rot of large and mature oranges.—The major part of the abscission of small fruits in the first weeks of their growth is believed to be due to a succession of daily water deficits in the young fruits due to the high temperature and low water content of the atmosphere. Readings of a porous clay atmometer bulb showed a very high rate of water loss. Observations in a grove bearing a companion crop of alfalfa showed that the rate of water

loss there was markedly reduced and that the trees yielded larger crops of fruit.—The authors believe that the shedding of young fruits may be overcome by such practices as, heavier and more frequent irrigation, the planting of summer intercrops, mulching with straw, protection by means of windbreaks, and moderate winter pruning.—*H. S. Reed.*

1265. McCLELLAND, T. B. **Influence of foreign pollen on the development of vanilla fruits.** Jour. Agric. Res. 16: 245–251. *Pl. 31–35.* 1919.—Attempts have been made to establish vanilla growing on a commercial scale in Porto Rico. Two types of plant are of economic value: *Vanilla planifolia* and *Vanilla* spp. The former is a plant having small, pale green blossoms, developing a long slender capsule tapering at the stem end but carrying its fullness well down towards the blossom end. It is of high quality. The latter type represents a group of varieties or species known as "vanillon" which agree in having large, yellow blossoms, fruits which are much thicker and shorter than those of *V. planifolia*, being of a more uniform thickness throughout.—When reciprocal crosses are made, a decided modification in the form of the fruit has resulted. It is usually so marked that these fruits can be distinguished from close fertilized fruits at a glance. Average relative girth measurements at stem-end and at blossom-end of *V. planifolia* selfed are 21.8 and 26.7 respectively and when fertilized with pollen from vanillon, 27.7 and 22.2. Similar measurements for vanillon selfed are 39.4 and 39.2 and of vanillon fertilized with pollen from *V. planifolia* 32.7 and 42.—These alterations are due to the difference in location of the ovules fertilized by the two kinds of pollen and a possible explanation of this is to be found in the relative proportions of the essential parts in the two flowers. At blossoming time, the ovaries are of about the same length but the style in the vanillon flower is much longer (up to 70 per cent.) than that of *V. planifolia.* But it is necessary to assume that there must be a certain maturity of development of the pollen tube before the ovule can be fertilized.—*D. Reddick.*

1266. MEEKING, ERNEST. **Standardized packing and grading of fruit.** Jour. Dept. Agric. Victoria 16: 741–746. *Pl. 3–7.* 1918.—A continuation of an earlier article (*ibid.* 16: 317) describing shipping cases for fruit and discussing the Fruit Case Act, which came into force in 1906.—*J. J. Skinner.*

1267. ROLFE, R. A. **Bulbophyllum robustum.** Curtis Bot. Mag. 15: *Pl. 8792 (colored).* 1919.

1268. ROLFE, R. A. **Govenia lagenophora.** Curtis Bot. Mag. 15: *Pl. 8794 (colored).* 1919.

1269. ROLFE, R. A. **Isabella virginalis.** Curtis Bot. Mag. 15: *Pl. 8787 (colored).* 1919.

PRODUCTS

1270. JOHNS, CARL O., A. J. FINKS, AND C. E. F. GERSDORFF. **Globulins of the cocoanut, Cocos nucifera. I. Preparation of cocoanut globulin. Distribution of the basic nitrogen in cocoanut globulin.** Jour. Biol. Chem. 37: 149–153. 1919.—See Bot. Absts. 2, Entry 147.

1271. JOHNS, CARL O., A. J. FINKS, AND MABEL S. PAUL. **Studies in nutrition. I. The nutritive value of cocoanut globulin and cocoanut press cake.** Jour. Biol. Chem. 37: 497–502. 1919.—The globulin of the cocoanut produces normal growth when used as the sole source of protein in an otherwise complete diet. Cocoanut press cake contains sufficient water-soluble vitamine and some fat-soluble vitamine, but the rate of growth is increased by adding butter fat to the diet.—*George B. Rigg.*

MORPHOLOGY AND TAXONOMY OF ALGAE

J. R. Schramm, *Editor*

1272. Anonymous. **Kelp potash production.** Pacific Fisherman 17: 64. 1919. Note on amount produced.—*T. C. Frye.*

1273. Church, A. H. **The phaeophycean zoid.** Jour. Bot. 57 (Suppl. II.): 1–7. 1919.—The motile cells in Phaeophyceae, viewed as retained flagellate phases in the life history of brown algae, are discussed in the light of older and more recent investigations. The point of insertion of the lateral cilia is regarded as the original "pole" of the zoid, the direction of the movement, however, implying that a change of polarity of about 90° has taken place from the original isokont condition with equal and distally inserted flagella. This change is believed to be correlated with a differentiation in function between the two flagella, one becoming a propeller and the other remaining a tractor, the two attaining a divergence of 180° in a direction at right angles to the original axis of polarity; in this way, the new "anterior" end is acquired. The term "anisokont" is suggested for the condition obtaining in the phaeophycean zoid with unequal and "laterally inserted" flagella. The author states that the older view that the flagella are formed from a peripheral zone of cytoplasm must be replaced by the view that they originate as outgrowths from a basal granule, as in many flagellates. The flagella are discussed as regards movements, length in relation to body of zoid, function as tactile sensitive organs, etc. Rate and duration of movement of zoid are also discussed as well as metabolic and ameboid movements of the zoid body. Considerable space is devoted to the modification of the zoid in consequence of the development of heterogamy and to its variation in different phyla of brown algae. The author considers that the flagella originally served to provide a means of vertical ascent, and not of lateral movement, for autotrophic pelagic phytoplankton organisms; in the Phaeophyceae, on the other hand, this inherited mechanism serves to bring gametes into proximity, although in forms living in violently agitated waters the flagella are of little value in this respect and are reduced (Dictyotaceae), as they have been with complete loss in the red algae. In quiet waters, the cilia are regarded as the only means of sexual approximation and as such may prove increasingly useful and tend to become exaggerated.—*J. R. Schramm.*

1274. Groves, J., and G. R. Bullock-Webster. **New variety of Nitella flexilis.** Jour. Bot. 57: 101–102. 1919.—*N. flexilis* var. *Fryeri* is described as new, from Cambridgeshire, West Norfolk, and in Huntingdonshire. It resembles *N. opaca.*—*K. M. Wiegand.*

1275. Mirande, Marcel. **Sur le chondriome, les chloroplastes et les corpuscules nucléolaires du protoplasme des Chara. [Concerning the chondriosome, chloroplasts, and nucleolar corpuscles in Chara.]** Compt. Rend. Acad. Sci. Paris 168: 283–286. *Fig. 1–7.* 1919.—Two species of *Chara*, *C. foetida* and *C. hispida*, were studied. Chondriosomes were found in all cells except those of the spermatogenous tissue of the antheridia.—The chloroplasts are located in the immobile layer of cytoplasm at the periphery of the cells. They appear in the initial cells as a mass of granules around the nucleus and at this stage have staining qualities similar to nucleoles. Author finds these granules to be identical with those observed by Kaiser (1896), Debski (1897, 1898), and Strasburger (1908). These granules were identified by Debski as being identical with the extra-nuclear nucleoles of Zimmermann (1896).—The granules soon migrate to the peripheral layer and enlarge, fragment, and turn green. In the cells of *Chara* are found granules staining like nucleoles which the author believes are nucleolar in nature and which appear to have been extruded from the nuclei.—*V. H. Young.*

1276. Transeau, E. N., and Hanford Tiffany. **New Oedogoniaceae.** Ohio Jour. Sci. 19: 240–243. *Pl. 14.* 1919.—Descriptions are given of the following undescribed forms: *Oedogonium hystricinum* and *O. Pisanum gracilis* from Illinois; and *Bulbochaete Bullardi* from Massachusetts.—*H. D. Hooker, Jr.*

1277. TURRENTINE, J. W. **Progress of the kelp potash industry.** Pacific Fisherman Year Book 1919: 111. 1919.—See Bot. Absts. 2, Entry 134.

1278. VANGOOR, A. C. J. **Zur Kenntnis der Oscillatoriaceen.** [**On Oscillatoriaceae.**] Recueil Trav. Bot. Néerland. 15: 255–262. *Pl. 2.* 1918.—The following new species are described from Holland: *Oscillatoria guttulata, O. amphigranulata, O. Redekei, O. Annae,* and *Lyngbya amplivaginata.* All the species are illustrated. In *Oscillatoria guttulata* many pseudovacuoles (the gas vacuoles of Klebahn) occur, which the author regards, with Molisch, as protoplasmic in nature; since the species is probably not a true plankton form, the author emphasizes that it presents another case contrary to the assertion of Klebahn that pseudovacuoles occur only in floating blue green algae.—*J. R. Schramm.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1279. FLORIN, R. **Cytologische Bryophytenstudien. I. Über Sporenbildung bei Chiloscyphus polyanthus (L.) Corda.** [**Spore-formation in Chiloscyphus polyanthus.**] Ark. för Bot. 15^{16}: 1–10. *Pl. 1, fig. 1–2.* 1918.—The heterotypic division is here described for the first time in one of the acrogynous Jungermanniales. No evidence of a quadripolar spindle could be found, the division proceeding in the usual way. Before the first stages make their appearance the spore mother cell already shows the lobate form, characteristic of so many Hepaticae, and the nucleus also appears more or less distinctly angular. The stages shown most clearly are the strepsinema, the diakinesis and the metaphase, the number of double chromosomes present being apparently ten. The homotypic division was not studied, but the fact was demonstrated that the formation of cell walls is delayed until both divisions have been completed.—*A. W. Evans.*

1280. FLORIN, R. **Das Archegonium der Riccardia pinguis (L.)** B. Gr. Svensk. Bot. Tidsk. 12: 464–470. *Fig. 1–4.* 1918.—In the first part of the paper several abnormal archegonia are described. In one of these the usual canal cells and egg are replaced by a row of egg-like cells with large nuclei and dense cytoplasm; in another two rows of canal cells are present; in a third the ventral canal cell shows two nuclei but no dividing wall; and in a fourth four nuclei are present in the egg cell. In the second part of the paper centrosome-like bodies are demonstrated in the egg cell. These are situated on opposite sides of the nucleus and from each one numerous rays extend almost to the periphery of the egg.—*A. W. Evans.*

PATHOLOGY

DONALD REDDICK, *Editor*

1281. ANONYMOUS. **Smut in oats and barley.** Jour. Bd. Agric. [London] 24: 1417–1419. 1918. Issued also as Food Production Leaflet 31.—Brief descriptions of the smuts with directions for control.—*D. Reddick.*

1282. ANONYMOUS. **Parsnip disease and its prevention.** Jour. Bd. Agric [London] 24: 1123. 1918.—Apparently a brief of COTTON, A. D. **Diseases of parsnips.** [See Bot. Absts. 1, Entry 1664.]

1283. BEACH. WALTER SPURGEON. **Biologic specialization in the genus Septoria.** Amer. Jour. Bot. 6: 1–33. *Pl. 1, 13 diagrams, 4 tables, 1 graph.* 1919.—Author briefly reviews the literature dealing with biologic specialization. 16 species of *Septoria* were studied as to their host relations. Most species do not have a broad range of hosts, but are limited to one or a few closely related species, usually belonging to the same genus. In many cases the host ranges were found to be narrower than those recorded in the host indices. Certain

species evidently are differentiated into biologic forms, since forms morphologically similar will not infect the same hosts. The disease characters of the host vary with the species, age and part of the host attacked, and with environmental conditions, and therefore are unreliable in taxonomy. Morphological characters in certain species of *Septoria*, particularly spore length, vary considerably under different environmental conditions and the taxonomic importance of such characters is therefore doubtful. Inoculation experiments showed that *S. malvicola* E. & M. and *S. fairmani* E. & E. are identical. The form of *S. convolvuli* upon *Convolvulus arvensis* is biologically as well as morphologically distinct from the type form of *S. convolvuli* described upon *C. sepium*, and is here proposed as a new species, *S. septulata*.—*E. W. Sinnott.*

1284. Coit, J. Eliot, and Robert W. Hodgson. **An investigation of the abnormal shedding of young fruits of the Washington navel orange.** Univ. California Publ. Agric. Sci. 3: 283–368. *Pl. 25–42, fig. 1–9.* 1919.—See Bot. Absts. 2, Entry 1264.

1285. Cook, Mel. T. **Potato spraying experiments in 1917.** New Jersey Agric. Exp. Sta. Rept. 1917: 561–563. 1918.—This paper is a record of spraying tests in three localities in the state in 1917. [See Bot. Absts. 2, Entries 504, 505.]—*M. T. Cook.*

1286. Darnell-Smith, G. P. **Fungous diseases of maize.** Dept. Agric. New South Wales Farmers' Bull. 116: 33–37. 1918.—The following diseases and the causal organisms are described briefly: ear rot (*Diplodia zeae*), American maize smut (*Ustilago zeae*), head smut (*Sorosporium reilianum*), rust (*Puccinia maydis*), leaf stripe (*Helminthosporium turcicum*).—*D. Reddick.*

1287. Dudley, F. H. **A few insects and diseases common to small fruits.** Maine Dept. Agric. Bull. 17[3]: 22–27. 1918.

1288. Faulwetter, R. C. **The angular leaf spot of cotton.** South Carolina Agric. Exp. Sta. Bull. 198. *41 p., Pl. 1–6, charts 1–5.* 1919.—The disease, caused by *Bacterium malvacearum*, first appears as dark green angular spots on the under surface of the leaves. These later appear upon the upper surface and become reddish brown. The spots are bounded by the larger veins thus giving them their angular form. The seasonal history is divided into two phases, (1) the primary infections upon the cotyledons and (2) the secondary infections upon the foliage, leaves, stems, bracts and bolls. Of the factors concerned in the hibernation of the organism, the contamination of short lint or fuzz upon the seed plays a most important part. The amount of injury caused by this disease has not been fully determined, varying in different portions of the country. Wind during rain was found to be an important agent of dissemination.—Sterilization of the seed coat by the use of sulphuric acid and mercuric chlorid was found to be the most efficient means of control.—*D. B. Rosenkrans.*

1289. Federal Horticultural Board, U. S. Dept. Agric. **Banana plant quarantine (foreign).** Service and Regulatory Announcements 50: 33. 1918.—Exclusion of all varieties of banana plants (*Musa* spp.) or portions thereof from introduction into U. S. A. from the following countries: Jamaica, Trinidad, Dominica, Martinique, Guadeloupe, Barbados, Brazil, Philippine Islands, Fiji Islands, Sumatra, Java, Madagascar, Queensland, India, North Borneo, and British New Guinea.—Cause, root borer (*Cosmopolites sordidus*).—*D. Reddick.*

1290. Federal Horticultural Board, U. S. Dept. Agric. **Banana plant quarantine (domestic).** Service and Regulatory Announcements 50: 34. 1918.—Exclusion of all varieties of banana (*Musa* spp.) or parts thereof from the territories of Hawaii and Porto Rico. Cause, the weevils known as *Rhabdocenemis obscurus* and *Metamasius hemipterus*.—*D. Reddick.*

1291. Federal Horticultural Board, U. S. Dept. Agric. **Notice of quarantine No. 34—Bamboo quarantine.** Service and Regulatory Announcements 55: 82. 1918.—Movement of

living seeds, plants or cuttings of all genera and species of the tribe Bambuseae into U. S. A. from all countries is prohibited. Cause, bamboo smut (*Ustilago shiraiana*) and other dangerous plant disease.—*D. Reddick.*

1292. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. **Potato wart in the United States.** Service and Regulatory Announcements 56: 90–91. 1918.—Potato wart (*Chrysophlyctis*) has been found in 26 mining towns of Pennsylvania. It was probably introduced on diseased stock imported in 1912. It has not been found in commercial potato-growing districts.—*D. Reddick.*

1293. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. **Quarantine on account of Japanese beetle.** Service and Regulatory Announcements 56: 91–92. 1918.—Sweet corn (*Zea*) from certain townships in the state of New Jersey is prohibited from interstate shipment in the United States, except after inspection and certification. Cause, Japanese beetle (*Popillia japonica*).—*D. Reddick.*

1294. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. Service and Regulatory Announcements 60: 17–27. 1919.—Notes on the following: Necessity of disinfection of railway cars which have been used for conveyance of fresh plant material; ballast [ship] as a possible means of introducing noxious insects and plants; memorandum concerning quarantine No. 37, restricting the importation of nursery stock and other plants and seeds after June 1, 1919, including a history of the steps leading up to the promulgation of the order and an account of the conditions which prompted it; notices of proposed hearings.—D. *Reddick.*

1295. FEDERAL HORTICULTURAL BOARD, U. S. DEPT. AGRIC. Rept. Fed. Hortic. Bd. **1918,** *19 p.* Washington, 1918.—Review of the activities of the board for the fiscal year. Data on importation and distribution of cotton, and nursery stock in U. S. A. List of current quarantines and other restrictive orders.—*D. Reddick.*

1296. HODGSON, C. M. **Spiked sandal wood.** Indian Forester 44: 66–71. 1918.—Referring only to the North Coimbatore Forest Division, author states: "I write to record my opinion that spike is not caused by fire, *Zizyphus*, lantana [*L. camara*] or any other feature of the environment but is an internal ailment due to some germ" or is a physiological peculiarity. Reasons for this belief are stated in some detail.—Observations on various ecological factors which were thought might have a bearing on the occurrence of the disease but none of which seems to have. [See also Bot. Absts. 2, Entries 1177, 1297, 1298, 1303, 1304 and 1307.]—*D. Reddick.*

1297. HOLE, R. S. **Spike disease of sandal.** Indian For. 44: 461–462. 1918.—Brief criticism of article by LUSHINGTON (Indian For. 44: 439. See Bot. Absts. 2, Entry 1177) and defense of author's position with respect to cause of spike disease, namely, that autogenetic origin of the disease is only a theory and not a "dictum." [See Bot. Absts. 2, Entries 1296, 1298, 1303, 1304 and 1307.]—*D. Reddick.*

1298. HOLE, R. S. **Spike disease of sandal.** Indian For. 44: 325–334. *Pl. 20–21.* 1918. —Rev. of article by VENKATARAMA AYYAR, Indian For. 44: 316–324, and defense of authors previous position, Indian For. 43: 430.—Spike disease probably was present long before 1898 but was brought prominently to notice at that time. *Zizyphus oenoplia* is found to be generally affected with a spike disease but its occurrence only lately has come to notice.—Isolation experiments by trenching should be allowed to continue for a longer period and finally it should be ascertained that roots of host plants have been excluded from the isolation areas.—Injury by fire was thought to be a factor only under dry, stony conditions.—Additional arguments based on observations are presented in favor of the theory of autogenetic origin of spike. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1303, 1304 and 1307.]—*D. Reddick.*

1299. Lemée, E. **La rouille des poiriers (Roestelia cancellata) et le genévrier sabine. [The rust of pears and Juniperus sabina.]** Bull. Soc. Path. Vég. France 4: 96–97. 1918.—Instances are cited in which severe attacks of pear rust have been found in the neighborhood of Junipers and have been prevented by the removal of the Junipers. A plea is made for the compulsory destruction of this host in pear growing sections.—*C. L. Shear.*

1300. Lees, A. H. **Reversion of black currants.** Ann. Rept. Agric. and Hortic. Res. Sta. Univ. Bristol 1917: 33–34. [1918].—See Bot. Absts. 2, Entry 1074, of which this is said to be a brief.—*D. Reddick.*

1301. Lint, H. Clay. **Report of potato spraying experiments.** New Jersey Agric. Exp. Sta. Rept. 1916: 604–617. 1918.—Seven different treatments were used in four localities in the state and the results recorded with discussion.—*M. T. Cook.*

1302. Lint, H. Clay. **Report of the sulfur potato scab experiment for 1916.** New Jersey Agric. Exp. Sta. Rept. 1916: 618–625. 1918.—This work was carried on in six localities in the state and was for the purpose of determining the value of sulfur as a soil treatment in the control of the potato scab organism (*Actinomyces chromogenus*).—*M. T. Cook.*

1303. Lushington, P. M. **Progress of spike investigation in the southern circle, Madras Presidency, during 1917-18.**—Indian Forester 44: 439–460. *2 folded charts.* 1918.—Résumé of work by author (Indian Forester 44: 114) and by Venkatarama Ayyar, (Indian Forester 44: 316) with extensions and additions.—Investigations to date do not support the theory of unbalanced circulation of sap. Means of spread of the disease is not known but author believes evidence points to transmission of infection by means of such hosts as *Zizyphus oenoplia, Dodonaea viscosa, Argyreia cuneata, Cipadessa fruticosa*, rather than by birds, flying foxes, insects, red spider, etc. Seed seems to be free from disease.—In some localities the disease spreads from tree to tree, and progresses more rapidly in individual trees, than in other localities.—The disease may manifest itself every month of the year except August but the period March to July is most favorable for its appearance. It does not progress regularly from branch to branch. Its appearance is readily detected but there is no way of determining when the tree became infected. Meagre data indicate that the incubation period may be 19 months.—It is not possible to state that the preventive measures adopted have been of any use. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1304 and 1307.]—*D. Reddick.*

1304. Lushington, P. M. **Spike disease in sandal. An interesting isolated area and its treatment.** Indian Forester 44: 114–117. 1918.—An area of 11 acres on the top of the Javadis, elevation 2800 feet, contained 65 diseased trees "one season old." This is 100 miles from any other known cases of the disease.—In October 1917 all sandal within the area and in a belt about one furlong in width was removed whether spiked or not, as were also the following plants, all of them subject to a spike-like disease: *Zizyphus oenoplia, Dodonaea viscosa, Scutia indica* and *Cipadessa fruticosa.* [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1303 and 1307.]—*D. Reddick.*

1305. McMurran, S. M. **Pecan rosette in relation to soil deficiencies.** U. S. Dept. Agric. Bull. 756. *11 p., 4 fig.* Washington, 1919.—Rosette is one of the most serious diseases of pecan in southeastern United States. Losses are incurred through reduced growth and decreased nut production. The disease, at first, is characterized by small, wrinkled, yellow-mottled leaves at the ends of branches; finally the tree dies back. There is also a shortening of internodes, and a forcing of dormant buds.—Empirical data indicated that a deficiency in humus, fertility and moisture supply has a causal connection with rosette. The present experimental work, conducted for the purpose of testing this view, extended over two years and involved the application of stable manure alone, cottonseed meal, alone, and combined with stable manure, and lime; check plats received no fertilizer. The first three fertilizers were very beneficial in restoring trees to a normal condition of growth, appearance

and nut-production. Lime on the other hand failed to improve the rosetted trees; in fact they grew worse.—Injury to feeding roots by plowing apparently aggravates the disease.—Control suggestions are along the line of soil improvement. Develop deeper surface soils between rows of trees by use of cover crops, by plowing deeper year after year until 8 or 10 inches of fertile soil is established. New cuttings should not be made on deep sand, clays underlain by sand, or on eroded hillsides. The soil type selected should approach as nearly as possible that in which the pecan grows in its natural habitat. The beneficial results with manure and cottonseed meal, alone or combined, highly commend the use of such fertilizers for rosette. Many orchards have been planted on unsuitable soils; in such cases the author advises building up such soils rather than replanting in a new location. [See Bot. Absts. 2, Entry 1146.]—*L. R. Hesler.*

1306. POOLE, R. F. **Report of celery investigations.** New Jersey Agric. Exp. Sta. Rept. 1917: 536–539. 1918.—A continuation of the work carried on by W. S. Krout in 1916 and is primarily a record of the influence of a number of chemicals used for the control of pathogenic soil organisms (*Bacterium sp.* causing crown rot, *Sclerotinia libertiana* causing stem rot and nematodes).—*M. T. Cook.*

1307. RAO, RAMA. **Field investigations of spike disease in sandal on the Kollimalai hills.** Indian Forester 44: 58–65. 1918.—Spike disease was found in the hills 80 miles from previously known diseased plants, the two cases found being 8 miles apart. Detailed observations on the ecological conditions under which the disease was found and which allow of no definite conclusion, and a minute description of the appearance and condition of the diseased trees.—Author is skeptical of the contagious or infectious nature of the disease.—A list of 57 hosts of sandal tree on the Kollimalais is appended. [See Bot. Absts. 2, Entries 1177, 1296, 1297, 1298, 1303 and 1304.]—*D. Reddick.*

1308. REINKING, OTTO A. **Philippine economic-plant diseases.** Philippine Jour. Sci. A, 13: 165–274. *43 fig., 22 pl.* 1918.—This paper describes the most important diseases found upon economic plants in Laguna and near provinces in Luzon, Philippine Islands; 339 diseases of 61 hosts are described. The hosts are arranged alphabetically, and diseases are described under each host. The description of each disease includes three topics: symptoms, causal organism, and control. Many of the diseases are described for the first time, only the fungi having been identified previously. Particularly important work was done with the following: *Phyllachora sorghi, Sclerotium, Rhizopus artocarpi, Pseudomonas citri, Rhizoctonia*, coconut bud-rot, *Hemileia vastatrix, Phytophthora colocasiae, Phytophthora nicotianae, Pythium debaryanum, Woroninella psophocarpi, Cercospora* sp. (on sugar cane), *Phytophthora faberi, Helminthosporium inconspicuum*, and *Sclerospora maydis*. A special section of the paper deals with the control of plant diseases; in this section are discussed plant sanitation, crop rotation, cultural methods, disease-resistant varieties, soil sterilization, and fungicides.—*S. F. Trelease.*

1309. SALMON, E. S., AND H. WORMALD. **An experiment in the treatment of covered smut of barley.** Jour. Bd. Agric. [London] 24: 1388–1394. *2 fig.* 1918.—The covered smut (*Ustilago hordei*) and loose smut (*U. nuda*) are briefly described. The presence of covered smut results in a depreciation of the grain due to the fact that maltsters claim to be unable to make pale ale from barley having much smut in it.—Experiments to control covered smut show that formalin dip is effective, sprinkling with copper sulfate (2.5 per cent solution) less effective, sprinkling with bordeaux mixture of little value and sweating on a malt kiln at 100°F. for 24 to 30 hours valueless.—*D. Reddick.*

1310. SHEAR, C. L. **Pathological problems in the distribution of perishable plant products.** —Mem. Brooklyn Bot. Gard. 1: 415–422. *Pl. 9–11.* 1918.—Examples are drawn from various sources to show the necessity for investigating the causes of and means of preventing deterioration and decay of plant products in transit, storage, and on the market.—The physiological behavior of decay-producing organisms, particularly with respect to temperature, humidity, etc., has an important bearing on determining responsibility for losses.—*D. Reddick.*

1311. SMITH, ERWIN F. **The relation of crown-gall to other overgrowths in plants.** Mem. Brooklyn Bot. Gard. 1: 448–453. 1918.—Outline of a lecture which is summed up by the author as follows: "My own belief is that all overgrowths are correlated phenomena, are the response of the organism to essentially similar (but not necessarily identical) stimuli, the visible difference in response when brought about by parasites being due to number and location of the parasites, age and kind of tissues invaded, and volume, direction, and velocity of the stimulus exerted. In other words, in every case, I think the stimulus is primarily a physical stimulus due to changed osmotic pressures rather than a direct chemical stimulus. Overgrowths, therefore, do not always involve the presence of a parasite although as observed in nature parasites are probably responsible for most of them."—*D. Reddick.*

1312. STEVENS, NEIL E., AND R. B. WILCOX. **Further studies of the rots of strawberry fruits.** U. S. Dept. Agric. Bull. 686. *18 p. Tables 1–8.* 1918.—The studies were made in the field, en route and in markets. Two types of rot are discussed: rhizopus rot (caused by *Rhizopus nigricans*) and botrytis rot (caused by *Botrytis* sp., probably *B. cinerea*). The former, known as leak, is the most important fruit rot found on growing ripe strawberries. The latter is a field rot, being most serious under excessively moist conditions. Control of leak is closely connected with handling methods. Of prime importance is the avoidance of injury to the epidermis. Berries should be picked in the cool of the morning, packed before rather than after washing, and placed at a low temperature. Rhizopus grows very slowly at 10°. A practical hint in this connection is found in the fact that the greater amount of rot occurs when the longer time is consumed in reaching 10°C.; it is important that this temperature be reached as quickly as possible. Botrytis-decayed berries should not be packed with fruit intended for market. It is found that *Rhizopus* rarely ever follows *Botrytis*.—*L. R. Hesler.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

DIFFUSION, PERMEABILITY

1313. HURD, ANNIE MAY. **The relation between the osmotic pressure of Nereocystis and the salinity of the water.** Publ. Puget Sound Biol. Sta. 2: 183–193. 1919.—As the water in which *Nereocystis* is grown is decreased in salinity the plant loses salts and takes in water, but maintains an average osmotic surplus of 3.62 atmospheres. In normal Puget Sound water with osmotic pressure of 19.2 atmospheres *Nereocystis* has an osmotic pressure of 22.72 atmospheres. The pressure within the plant was slowly lowered to 12.52 atmospheres without resulting in death, by reducing the water to 17/28 fresh. The plant can endure 100 per cent fresh water if the reduction of salt is gradual enough for the pressure within the cells to adjust itself to that outside, but not if the change is sudden.—*T. C. Frye.*

1314. OSTERHOUT, W. J. V. **Decrease of permeability and antagonistic effect caused by bile salts.** Jour. Gen. Physiol. 1: 405–408, 1919.—The author finds that sodium taurocholate is able to produce a decrease in permeability and to antagonize NaCl; also, that antagonistic relations can be predicted by finding the effect on permeability of each substance by itself, inasmuch as substances which decrease permeability antagonize those which increase it.—*J. M. Brannon.*

1315. SCHRYVER, S. B., AND N. E. SPEAR. **Investigations dealing with the state of aggregation. Part IV.—The flocculation of colloids by salts containing univalent organic ions.** Proc. Roy. Soc. London B, 90: 400–414. 1919.—With certain exceptions, in cases tested, no general relationship was found between the surface tensions of normal solutions and the capacity of salts to flocculate colloids.—*P. B. Sears.*

1316. MAZE, P. **Recherche d' une solution purement minérale capable d' assurer l'evolution complète du mais cultivé à l'abal des microbes. [Investigation of a purely mineral solution capable of insuring the complete development of cultivated maize protected from microbes.]** Ann. Inst. Pasteur 33: 139–173. *Fig. 1–8.* 1919.—The influence of dilute solutions of aluminium, boron, iodin, fluorin and arsenic, in the form of salts, upon the development of maize was studied by growing the plants in a pure mineral salt solution. The latter contained nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, iron, silicon, zinc, manganese and sodium ($NaNO_3$, KH_2PO_4 and K_2HPO_4, $MgSO_4$, $CaCO_3$, $FeSO_4$, K_2SiO_3, $ZnCl_2$, and $MnCl_2$). Minimum quantities of boron, aluminium, fluorin, and iodin were found to be indispensable to the growth of maize, the degree of usefulness being in the order named. Arsenic was found to be of no value.—Similar studies were made of the effect of different organic salts and humus compounds when added to the above pure mineral salt solution. In the early period of growth, these appeared to exert some influence, whereas at the end of the experiment no appreciable effect could be noted. Further experiments were carried on to determine the influence of aeration and the state of oxidation of the iron compounds upon the progress of growth.—*Walter G. Sackett.*

METABOLISM (NITROGEN RELATIONS)

1317. BONAZZI, AUGUSTO. **On nitrification. II. Intensive nitrite formation in solution.** Jour. Bact. 4: 43–60. *Pl. 1, fig. 1–2.* 1919.—By the use of Fernback flasks having a surface bottom of approximately 300 square centimeters, adjusted to a slowly revolving klinostat placed at an angle of about 5 degrees from the vertical, a very luxuriant growth of nitrite-forming bacteria was produced in the Omelianski solution. The growth of these organisms is reported by the author to be far in excess of any yet recorded for equal periods of time in solution cultures. Better aeration and a change of local environment by removal of by-products, or of better access of mineral nutrients, are suggested as the factors contributing to intensive nitrification.—*Chester A. Darling.*

1318. BREWSTER, J. F., AND C. L. ALSBERG. **Determination of the distribution of nitrogen in certain seeds.** Jour. Biol. Chem. 37: 367–371. 1919.—Analyses of cottonseed flour, tomato seed (pressed), cow pea (*Vigna sinensis*), jack bean (*Canavalia ensiformis*), corn (*Zea mays*), corn germ (pressed), wheat, Kafir corn (*Andropogon sorghum*) and kafarin were made by the Van Slyke method to determine the amount of nitrogen present in various forms (amide N, humin N, arginine N, histidine N, cystine N, lycine N, and amino N). The results agree in general with those obtained by other workers. Determinations of the nitrogen distribution in the nucleic acid of yeast were also made. Fifteen per cent. of the total nitrogen of the acid appears in the arginine fractions, although the nucleic acid contains no arginine. Erroneous results may be obtained by using the Van Slyke method on materials containing nucleic acid.—*George B. Rigg.*

1319. TEMPLE, J. C. **The value of ammonification tests.** Georgia Agric. Exp. Sta. Bull. 126. *18 p.* 1919.

GROWTH, DEVELOPMENT, REPRODUCTION

1320. BOSE, J. C., AND G. DAS. **Researches on growth and movement in plants by means of the high magnification crescrograph.** Proc. Roy. Soc. London B, 90: 364–400. *Fig. 1–17.* 1919.—Author describes a self-recording growth-meter with maximum magnification of growth-changes up to 10,000.—By means of delicate experiments of short duration exact reactions of plants to various stimuli were ascertained. Growth and nastic and tropic (including pulvinal) reactions were shown to have a definite homologous basis. The direct application of a stimulus induces contraction; while indirect application, i.e., upon a region distant from the point of response, gives rise to expansion. Unilateral stimulation causes positive curvature by contraction of the proximal side (direct effect) and expansion of distal side (indirect effect), e.g., in a growing stem. Transverse conduction of excitation induces

contraction of the opposite side, neutralizing or reversing the positive responsive curvature; that is, if the stimulus be strong enough it travels through protoplasm to a region where the indirect effect has already appeared, neutralizing the latter by establishing a direct, or contractive, effect. Cases of differential excitability in two halves of anisotropic organs were considered.—*P. B. Sears.*

TEMPERATURE RELATIONS

1321. Burgess, James L. **Relation of varying degrees of heat to the viability of seeds.** Jour. Amer. Soc. Agron. 11: 118–120. 1919.—In an investigation of means of destroying insect pests in stored seed, it was found that a temperature of 140° to 158° F. continued through 5 hours had no appreciable detrimental effect on the viability of garden beans. Cow peas were almost killed at 194° during a period of 5 hours, while their viability was unaffected at 140° for 1 hour. Soybeans were unaffected at 140°–194° through periods of 1, 3 and 5 hours. A temperature of 176° to 212° for 5 hours did not affect the viability of rye, while 230° for 2 hours reduced the viability 78 per cent. The viability of wheat was reduced 60 per cent at a temperature of 230° for 1 hour.—*J. J. Skinner.*

1322. Hamilton, Herbert C. **Digitalis leaves: effect on activity of temperature in drying.** Jour. Amer. Chem. Soc. 41: 125–130. 1919.

MISCELLANEOUS

1323. Faulwetter, R. C. **The angular leaf spot of cotton.** South Carolina Agric. Exp. Sta. Bull. 198. *41 p. Pl. 1–6, charts* 1–5. 1919.—See Bot. Absts. 2, Entry 1288.

1324. Koch, G. P., and J. R. Butler. **Cross-inoculation of legumes.** Soil Sci. 6: 397–403. 1918. See Bot. Absts. 3, Entry 362.

SOIL SCIENCE

J. J. Skinner, *Editor*

1325. Anonymous. **Kelp potash production.** Pacific Fisherman 17: 64. 1919. Note on amount produced.—*T. C. Frye.*

1326. Anonymous. **Hercules kelp plant may continue.** Pacific Fisherman 17: 46. 1919. —Note.—*T. C. Frye.*

1327. Anonymous. **California kelp fleet sold.** Pacific Fisherman 17: 52. 1919.—Note on probable activity in the kelp industry.—*T. C. Frye.*

1328. Beckwith, Charles S. **Report on cranberry investigations for the season of 1918.** Proc. Ann. Meet. Amer. Cranberry Growers' Assoc. 49: 3–15. *Pl. 1–6.* 1919.—See Bot. Absts. 2, Entry 1262.

1329. Bonazzi, Augusto. **On nitrification. II. Intensive nitrite formation in solution.** Jour. Bact. 4: 43–60. *Pl. 1, fig. 1–2.* 1919.—See Bot. Absts. 2, Entry 1317.

1330. Brown, P. E., and D. R. Johnson. **Effects of certain alkali salts on ammonification.** Iowa Agric. Exp. Sta. Res. Bull. 44. 1918.—The effect of the salts, Na_2CO_3, $NaHCO_3$, Na_2SO_4 and NaCl, on ammonification in the presence and in the absence of $CaCO_3$ was studied. $CaCO_3$ when used alone exerted a marked beneficial influence on ammonification. The greatest effect occurred with 0.3 per cent, but up to 5 per cent no decrease occurred. With Na_2CO_3 a stimulating effect was observed at a concentration of 0.1 per cent; with $NaHCO_3$ at 0.05 per cent; with Na_2SO_4 at 0.1 per cent; and with NaCl at 0.005 per cent. Increased additions of these salts, however, failed to stimulate the ammonifiers but on the contrary retarded their action. For the soil used the point of toxicity was between 0.1 per cent and

0.2 per cent for Na_2CO_3; between 0.05 per cent and 0.1 per cent for $NaHCO_3$; between 0.1 per cent and 0.5 per cent for Na_2SO_4; and between 0.005 per cent and 0.01 per cent for NaCl. Increasing additions of all these salts brought about gradually increasing depressions in ammonification. When $CaCO_3$ was used with these salts it was found to reduce their toxicity to a considerable extent in every case, and in some instances made the toxic amounts of the salts actually stimulative to ammonification. Various combinations of the alkaline salts exhibited a greater toxic effect than the same salts in the same concentration exhibited individually.—*W. H. Ross.*

1331. DAVIDSON, J. **Do seedlings reduce nitrates?** Jour. Biol. Chem. 37: 143–148. 1919.—See Bot. Absts. 2, Entry 168.

1332. FRED, E. B. **The effect of certain organic substances on seed germination.** Soil Sci. 6: 333–349. *Pl. 1–4.* 1918.—Casein, powdered alfalfa, and peptone do not seriously injure seed germination in the soil unless used in large quantities (0.5 per cent or more). Calcium carbonate does not lessen the injurious effect on germination of large applications of alfalfa powder or casein. Sugar (about 1 per cent) added to the soil retards seed germination. In large amounts it decreases the percentage of germination. The retarding action of sugar on the germination of seeds is perhaps due to the large amount of carbon dioxide given off in the decomposition of the sugars.—*W. J. Robbins.*

1333. HARTWELL, B. L., AND F. R. PEMBER. **The presence of aluminum as a reason for the difference in the effect of so-called acid soils on barley and rye.** Soil Sci. 6: 259–279. *Pl. 1.* 1918.—The reason why acid soils are more harmful to barley than rye was investigated. Substances found to affect rye and barley about alike were sterilized soil, acid in nutrient solution, hydrogen peroxide, dihydroxystearic acid, manure extract, ammonium sulfate, potassium permanganate, chromium and silicon. Aluminum sulfate was more toxic to barley than rye. An examination of the aqueous extract of the acid soil used proved aluminum to be the element responsible for the different influence on the plants. Treatment of an acid soil with acid phosphate reduced the amount of active aluminum in the soil and caused remarkable growths of plants so sensitive to an untreated soil that previously no growth was possible. The results indicate that the practical advantage of phosphating and liming may often prove to be due to the precipitation of active aluminum quite as much as to supplying phosphorus as a nutrient and lime as a reducer of acidity. [See Bot. Absts. 2, Entry 1137.]—*W. J. Robbins.*

1334. McCOOL, M. M., AND C. E. MILLER. **Soluble salt content of soils and some factors affecting it.** Michigan Agric. Exp. Sta. Tech. Bull. 43. *47 p.* 1918. It is shown that the translocation of salts in the soil is due mainly to water movements. When large quantities of salt are present there is a movement to areas of lower concentration even when water movements are prevented. The accumulation of soluble salts on the surface of uncropped areas indicate that when water movements occur in the soil, salts are carried along with it. That these movements do not take place to any great depth is evidenced by the results of various investigations showing but little movement of water from the subsoil to the feeding zone of the roots. It is considered improbable that any great quantity of soluble material is supplied to the plants from depths below those of root penetration. The quantity of soluble salts in greenhouse soils may become too great for proper plant development, and in certain muck soils plant growth may be inhibited by the accumulation of soluble substances in the upper layers. Experiments made with corn and barley cultures show that plants may materially reduce the soluble salt content of the soil. Field experiments also gave evidence in the same direction, but to a less marked degree. As a result of laboratory experiments it would appear further that the constituents of soils which have been cropped for a long period of years go into solution at a somewhat slower rate than do those of the corresponding virgin soils. The rate of solution in the case of the soils studied is governed to some extent by temperature, it being more rapid at 25° than at temperatures approaching 0°. The moisture content, moreover, has a marked influence on the rate of solubility of the soil constituents,

and it is pointed out that biological activities probably play an important rôle in these phenomena. A seasonal variation in the salt content of field soils was shown by an examination of several soil classes at different periods during the spring and summer months. In the case of all the mineral soils tested, there was noted a tendency for the soil solution to reach a maximum concentration in the early summer when plant growth is at a maximum.—*W. H. Ross.*

1335. Potter, R. S., and R. S. Snyder. **The organic phosphorus of soil.** Soil Sci. 6: 321–332. 1918.—The authors test a method previously described of determining organic phosphorus in the soil. By comparing the hydrolysis curves of phytin and nucleic acid with the hydrolysis curves of the organic phosphorus in three soils they conclude that nucleic acid was not present but phytin or a pyrmidine nucleotide may have been present. [See Bot. Absts. 2, Entry 1123.]—*W. J. Robbins.*

1336. Richardson, A. E. V. **Agriculture. America and Australia compared.** Jour. Dept. Agric. Victoria 17: 1–20. 1919.

1337. Schryver, S. B., and N. E. Spear. **Investigations dealing with the state of aggregation. Part IV.—The flocculation of colloids by salts containing univalent organic ions.** Proc. Roy. Soc. London B, 90: 400–414. 1919.—See Bot. Absts. 2, Entry 1315.

1338. Stewart, Robert, and F. A. Wyatt. **Limestone action on acid soils.** Illinois Agric. Exp. Sta. Bull. 212: 267–296. 1919.—For the common prairie land of southern Illinois an application of 1 ton per acre of limestone once in 3 or 4 years is sufficient to keep the soil alkaline, after the initial acidity has been destroyed by heavier applications. Dolomitic limestones can be used successfully on acid soils. It is slightly more effective than high-Ca limestone in neutralizing the soil acidity, is more durable, and has no injurious effects. Limestone applied to the surface slowly penetrates into the subsurface, but does not seem to have any effect upon the acidity of the subsoil. The amount of native limestone found in the subsoil is a variable quantity. In some cases there is none present even at a depth of 40 inches, whereas in other cases it extends upward even slightly into the subsurface. The results indicate that chemical analysis may be depended upon to measure the acidity of the soil, the reduction of activity due to the action of limestone applied, and also to find the limestone still remaining in the soil.—*W. H. Ross.*

1339. Tottingham, W. E. **A preliminary study of the influence of chlorides on the growth of certain agricultural plants.** Jour. Amer. Soc. Agron. 11: 1–32. 1919.—See Bot. Absts. 2, Entry 817.

1340. Turrentine, J. W. **Progress of the kelp potash industry.** Pacific Fisherman Year Book 1919: 111.—General condition of the industry on the Pacific Coast. A general statement of the work of the experimental plant of the U. S. Bureau of Soils at Summerland, California.—*T. C. Frye.*

1341. Van Alstine, E. **The movement of plant food within the soil.** Soil Sci. 6: 281–308. 1918.—Analyses were made of the amount of phosphorus, calcium, magnesium, nitrogen, potassium, organic carbon and limestone in samples of soil from the surface 3 inches and two strata below the surface of fertilized and unfertilized plots under treatment for 54 years at Rothamsted, England. Analyses were also made of the phosphorus in samples from fertilized and unfertilized plots under treatment since 1882 at State College, Pa., and from plots which have been treated for 20 years at Strongsville, Ohio. The author concludes that when phosphorus is used as a fertilizer it remains almost where it is placed in the soil until removed in crops or by some process like erosion. The addition of alkali salts (sulfates of potash, soda and magnesia) seems to encourage the utilization of phosphorus by legumes. Loss of nitrogen through drainage is very small when crops are kept on the ground through the growing season. Potassium though easily and quickly fixed in the soil is subject to move-

ment within the soil as a result of fertilizing with other salts. The loss of Mg is brought about by the use of ammonium salts. Ammonium salts also increase the loss of Ca from the soil. A review of the literature is given.—*W. J. Robbins.*

1342. WAKSMAN, SELMAN A., AND ROLAND E. CURTIS. **The occurrence of actinomycetes in the soil.** Soil Sci. 6: 309–319. 1918.—The number of bacteria developing on an albumen agar at 25°C. in 3 days was compared with the number of actinomycetes developing at the same temperature in 14 days from 25 soils of North America and the Hawaiian Islands. The per cent. of actinomycetes varied from 3.5 to 46.0 per cent. with an average of 17 per cent. The soils higher in undecomposed organic matter gave the larger per cent. of actinomycetes colonies. By isolation of the actinomycetes and separation into types some were found to be of general distribution.—*W. J. Robbins.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

SPERMATOPHYTES

1343. ANONYMOUS. **Diagnoses Africanae. LXXI.** Bull. Misc. Inf. Kew 1918: 202–207. 1918.—This article contains descriptions of the following plants new to science: *Raphidiocystis ugandensis* Rolfe, *Salvadora angustifolia* Turrill, **Apterantha** C. H. Wright (a new genus of the Amarantaceae), *A. oligomeroides* C. H. Wright, *Loranthus aldabrensis* Turrill, *Phyllanthus Cheloniphorbe, Cluytiandra peltata, C. Baronii, Acalypha claoxyloides, A. Fryeri* Hutchinson, and *Widdringtonia dracomontana* Stapf.—*J. M. Greenman.*

1344. BENNETT, ARTHUR. **Notes on British Potamogetons.** Jour. of Bot. 57: 10–20. 1919.—Notes "suggested by a perusal of Herr Hagstrom's Critical Researches on the genus" (Jour. Bot. 55: 115. 1917.) Brief notes on nomenclature, morphology, taxonomy, and distribution. Thirty-eight species and several varieties are treated, several of which are found also in America. The nomenclature of some American species is affected.—*K. M. Wiegand.*

1345. BOULGER, G. S. **Juncus acutus L.: a correction.** Jour. of Bot. 57: 21. 1919.—The plant reported from the Andrews Herbarium as this is really *J. glaucus.*—*K. M. Wiegand.*

1346. BROADWAY, W. E. **The wild orchids of Tobago.** Bull. Dept. Agric. Trinidad and Tobago 17: 95–100. 1918.—List of 52 species.—*D. Reddick.*

1347. CRAIB, W. G. **Contributions to the flora of Siam. Additamentum X.** Bull. Misc. Inf. Kew 1918: 362–371. 1918.—The following flowering plants are described as new to science: *Evodia glomerata, Gynostemma siamaca, Schefflera siamensis, Lysimachia lancifolia,* **Damrongia** (a new genus of the Gesneriaceae), *D. purpureo-lineata, Petrocosmea Kerrii, Ruellia bella, Asystasia salicifolia, Vitex Pierrei, Elsholtzia Winitiana, Croton siamensis, Dalechampia elongata, Celtis Collinsae,* and *Gironniera longifolia.*—*J. M. Greenman.*

1348. FAWCETT, WILLIAM, AND A. B. RENDLE. **Notes on Jamaica plants.** Jour. Bot. 57: 65–68. 1919.—[Continued from Jour. Bot. 55: 271. 1917.] Euphorbiaceae discussed; the following species described as new: *Phyllanthus* (sect. *Euphyllanthus*) *minor, P.* (sect. *Xylophylla*) *inaequaliflorus,* and *P.* (sect. *Xylophylla*) *Coxianus.* Critical notes on several other species are given. One new combination, *P. glabellus* (L.), is made.—*K. M. Wiegand.*

1349. GAGNEPAIN, F. **Lagerstroemia nouveaux d'Indo-Chine. [New Lagerstroemias from Indo-China.]** Not. Syst. 3: 355–363. Dec. 30, 1918.—The following new species are described: *Lagerstroemia angustifolia, L. cochinchinensis, L. crispa, L. Duperreana, L. petiolaris* Pierre, *L. corniculata, L. glabra, L. Lecomtei, L. siamica, L. Spireana,* and *L. Thorelii* Gagnep.—*J. M. Greenman.*

1350. Gagnepain, F. **Quelques Illigera nouveaux.** [Some new Illigeras]. Not. Syst. 3: 363–366. Dec. 30, 1918.—The following new species of China are described: *Illigera Fordii*, *I. glandulosa*, *I. Pierrei*, and *I. Thorelii*.—*J. M. Greenman.*

1351. Gagnepain, F. **Deux Gisekia et Mollugo nouveaux d'Indo-Chine.** Not. Syst. 3: 367–368. Dec. 30, 1918.—The author describes *Gisekia Pierrei* and *Mollugo herniarioides* as new species from China.—*J. M. Greenman.*

1352. Gagnepain, F. **Seconde espèce, Tonkinoise, d'un genre monotype Chinois: Carrierea Vieillardii Gagnep. [A second species from Tonkin of a monotypic Chinese genus: Carrierea Vieillardii Gagnep.]** Not. Syst. 3: 368–371. *Fig. 1–6.* Dec. 30, 1918.—The species mentioned in the title is described and illustrated, as new to science; it was collected in the province of Tonkin, China, and is dedicated to M. Vieillard, inspector of agriculture at Hanoi. —*J. M. Greenman.*

1353. Gagnepain, F. **Quelques Barringtonia nouveaux. [Some new Barringtonias.]** Not. Syst. 3: 383–385. Dec. 30, 1918.—Four new species are described from China, namely *Barringtonia annamica*, *B. comosa*, *B. longipes*, and *B. micrantha*.—*J. M. Greenman.*

1354. Koorders, S. H. **Abbildung und Beschreibung von Crateriphytum moluccanum Scheffer. [Illustration and description of Crateriphytum moluccanum Scheffer.]** *8 p., double table (1 a, 1 b).* Privately printed: Batavia (Java), Jan. 31, 1919.—A detailed description of the genus and the first published description of the species. The genus, a monotypic one from Amboina, is shown to be allied to *Couthovia* of the Loganiaceae.—*E. D. Merrill.*

1355. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 6. *P. 137–177., Pl. 148–151.* William Applegate Gullick: Sydney, 1919.—Seven species and several varieties are described and illustrated, namely, *Eucalyptus occidentalis* Endlicher with four varieties one of which is new, *E. macrandra* F. v. M., *E. salubris* F. v. M. with one new variety, *E. cladocalyx* F. v. M., *E. Cooperiana* F. v. M., *E. intertexta* R. T. Baker, and *E. confluens* (Fitzgerald) Maiden.—*J. M. Greenman.*

1356. Mott, F. Blount. **Impatiens glanduliferum Royle.** Jour. Bot. 57: 69. 1919. —Record of its occurrence near Peterson, Wales?—*K. M. Wiegand.*

1357. Nelson, J. C. **The name Toxylon again.** Amer. Bot. 25: 21–23. 1919.—The generic name of the Osage Orange is shown to have been originally published by Rafinesque as *Ioxylon*, later changed by him to *Joxylon* and still later to *Toxylon*. The specific name was originally *pomiferum* but with the final change in the generic name Nuttall's *aurantiacum* was used.—*W. N. Clute.*

1358. Osterhout, Geo. E. **Additions to the flora of Colorado.** Bull. Torrey Bot. Club 46: 53–56. 1919.—The following new species are described: *Nuttallia hastata*, *Phacelia formosula*, *Oreocarya monosperma*, *Mertensia Clokeyi*, and *Agoseris frondifera*.—*P. A. Munz.*

1359. Pennell, Francis W. **Concerning duplicate types.** Torreya 19: 13–14. 1919.— In place of the expression "duplicate type," defined by Hitchcock (Science 21: 832) as "a specimen of the same series or set as the type as indicated by the number or other data," the term *isotype* is proposed.—*J. C. Nelson.*

1360. Pennell, Francis W. **Some remarks upon Limosella.** Torreya 19: 30–32. 1919. —*Limosella aquatica* L. of the Rocky Mountain region and *L. subulata* Ives are described and contrasted. The Rocky Mountain plant cannot be distinguished from that of Eurasia, *L. aquatica* is the most widely distributed member of the Scrophulariaceae, and occurs on all the continents. The deviations are mostly slight and remote; but it has "thrown off" suggestively parallel species, of which *L. subulata* may possibly be closely duplicated in the Vancouver Island region and in Argentina. *L. subulata* has been studied from a colony about

Old Sams Pond, Point Pleasant, New Jersey. Specimens from this and other from water ponds along the Atlantic coast are partially though not constantly recognizable from those of saline habitats. The range of *L. subulata* must be extended southward to Chesapeake Bay. The more southern plants are coarser, usually with wider and longer leaves than the typical New England form. While primarily a plant of brackish soil, it is fully able to meet a non-saline environment.—*J. C. Nelson.*

1361. SPENCE, MAGNUS. **Juncus effusus spiralis.** Jour. Bot. 57: 69. 1919.—Record of its occurrence in Orkney.—*K. M. Wiegand.*

1362. STAPF, OTTO. **Gramineae. Flora of Tropical Africa 9:** (part 2) 193–384. 1918.—Part 1, which appeared in 1917, carried the account of the grasses through the Andropogoneae as far as the genus *Schizachyrium.* Part 2 is a continuation of this tribe as far as the genus *Exotheca.* The key to genera in part one shows that there are still seven genera of Andropogoneae to appear. The subgenera of Hackel are given generic rank by Stapf, such as, *Sorghum, Chrysopogon, Amphilophis, Dichanthium, Schizachyrium, Cymbopogon,* and *Heteropogon.* The keys and descriptions are unusually ample. The citations are not only of synonyms but also of the bibliography of each name. Specimens are fully listed. The new species in this part are distributed as follows: *Schizachyrium* 4, *Andropogon* 12, *Cymbopogon* 2, *Hyparrhenia* 16.—*A. S. Hitchcock.*

1363. TURRILL, W. B. **Contributions to the flora of Macedonia. I.** Bull. Misc. Inf. Kew 1918: 249–341. 1918.—The present paper "is based on collections made, in their spare time, by men engaged on active service with the British Salonika Forces." The region concerned is primarily that between Salonika and the Struma Plain and Krusa Balkan. An account of the topography, geology, meterology, and ecology precedes a systematic enumeration of the plants collected. Only spermatophytes and ferns are recorded; the list includes 625 species and varieties. The following are new: *Silene Harrisii, Viscia grandiflora* Scop. var. *sordida* Griseb. mutant *dissecta, Saxifraga graeca* Boiss. & Heldr. var. *Russellii, Jurinea arachnoidea* Bge. forma *integrifolia,* and *Campanula Spruneriana* Hmpe. var. *lepidota.*—*J. M. Greenman.*

1364. VAN SLOOTEN, D. F. **Bijdrage tot de kennis der Combretaceen en Flacourtiaceën van Nederlandsch-Indie. [Contribution to the knowledge of the Combretaceae and Flacourtiaceae of the Dutch-Indies.]** 8vo. *170 p. Pl. 1-2. Index.* A. Oosthoek. Utrecht. 1919.—The author presents a synoptical revision of these two families as represented in the Dutch East Indies. The following new species and varieties are described: *Terminalia Soembawana, T. borneensis, T. longespicata, Combretum glandulosum, Quisqualis sulcata, Q. sulcata* var. *subcordata* of the Combretaceae and *Hydnocarpus pentagyna, Taraktogenos polypetala, Ryparosa borneensis, Homalium novoguineense, Flacourtia Zippelii,* and *F. lancleolata* of the Flacourtiaceae.—*J. M. Greenman.*

1365. WILLIAMS, KATHERINE A. **A botanical study of skunk-cabbage, Symplocarpus foetidus.** Torreya 19: 21–29. *Pl. 1-2, fig. 1-13.* 1919.—See Bot. Absts. 2, Entry 981.

1366. WILLIS, J. C. **The flora of Stewart Island (New Zealand): a study in taxonomic distribution.** Ann. Bot. 33: 23–46. *2 fig.* 1919.

PTERIDOPHYTES

1367. KILLIP, ELLSWORTH P. **Fern hunting in Panama.** Amer. Fern. Jour. 9: 5–17. 1919.

1368. MACCAUGHEY, VAUGHAN. **The Pala or Mule's-Foot Fern (Marattia Douglasii (Presl) Baker) in the Hawaiian Archipelago.** Torreya 19: 1–8. 1919.—See Bot. Absts. 2, Entry 979.

1369. MAXON, WILLIAM R. **Notes on American Ferns. XIII.** Amer. Fern Jour. 9: 1–5. 1919.—The author lists seven species of ferns, the range of which has been extended. The distinguishing characters of *Cheilanthes Eatoni* Baker and *C. tomentosa* Link are contrasted.—*F. C. Anderson.*